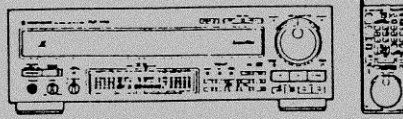


# Service Manual



ORDER NO.  
ARP2244

CD CDV LD PLAYER

# CLD-3090

- This manual is applicable to the KU/CA type.
- As to Circuit and Mechanical description, refer to the CLD-1090/2090/3090 Service guide (ARP2234).

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This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual. Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

**WARNING**

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5). When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

**1. SAFETY INFORMATION**

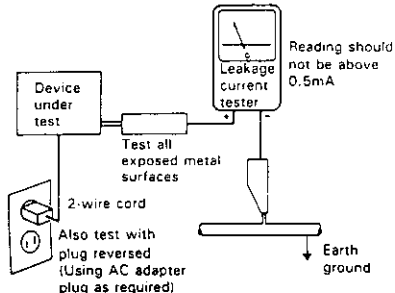
(FOR USA MODEL ONLY)

**1. SAFETY PRECAUTIONS**

The following check should be performed for the continued protection of the customer and service technician.

**LEAKAGE CURRENT CHECK**

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

**2. PRODUCT SAFETY NOTICE**

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a  $\Delta$  on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

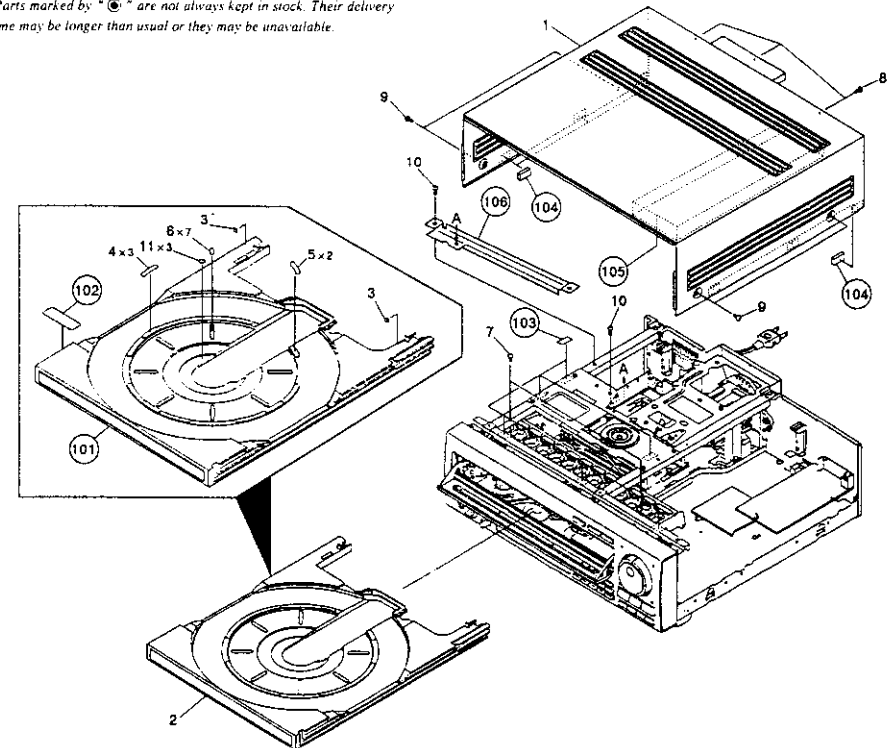
**2. EXPLODED VIEWS AND PARTS LIST**

**2.1 EXTERIOR SECTION**

Part List		Part List					
Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
	1	Bonnet-S	VXX1535	101	Tray		
	2	Tray assembly-S	VXX1534	102	Carry label		
	3	Tray rubber	VEB1089	103	Cushion		
	4	Disc pad (L)	VEC1191	104	Cushion		
	5	Disc pad (B)	VEC1379	105	Cushion		
	6	Disc pad (C)	VEC1380	106	Reinforced plate angle		
	7	Screw	VCZ30P100FMC				
	8	Screw	BBT30P060FCC				
	9	Screw	BCZ40P060FZK				
	10	Screw	1BZ30P060FCC				
	11	CD pad	VEC1252				

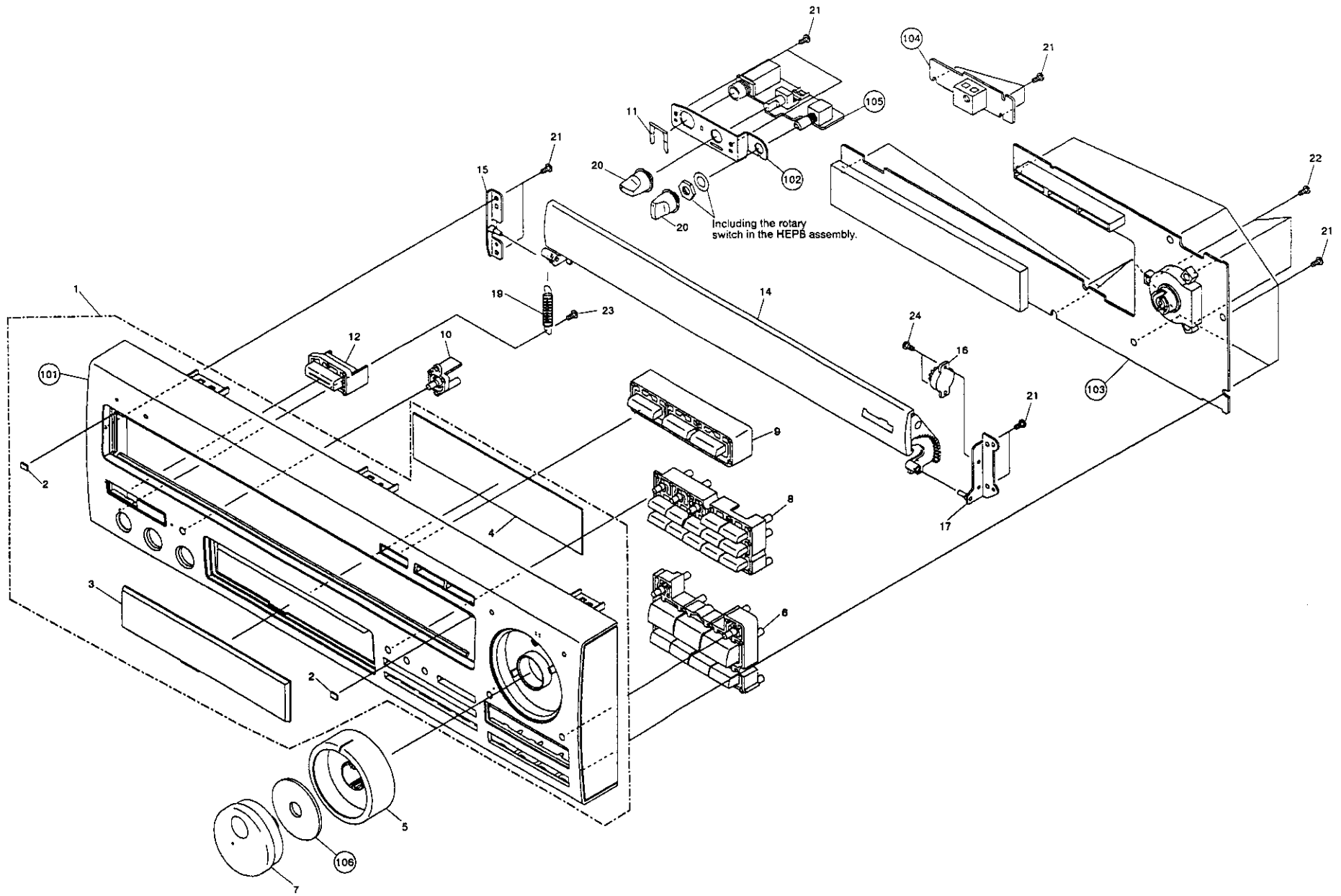
**NOTES:**

- Parts without part number cannot be supplied.
- The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by "⊗" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.



2.2 FRONT PANEL SECTION

Parts List						
Mark	No.	Description	Part No.	Mark	No. Description	Part No.
	1	Front panel assembly - S	VXX1540	101	Front panel assembly	
	2	Door dump rubber	VEB1141	102	Jack holder	
	3	FL lens	VNK1540	103	FLKY assembly	
	4	FL filter	VNK1677	104	PWSB assembly	
	5	Shuttle assembly	VXA1513	105	HEPB assembly	
	6	Main key	VNK1552	106	JOG plate	
	7	JOG dial	VNK1551			
	8	Ten key	VNK1542			
	9	L key assembly	VXA1519			
	10	Gold button (A)	VNK1547			
	11	Snap plate	VNE1102			
	12	PW button	VNK1536			
	13	Earth plate	VBK1020			
	14	Front door assembly	VXA1588			
	15	Hinge plate assembly	VXA1518			
	16	Dumper assembly	VXA1053			
	17	Dumper plate assembly	VXA1517			
	18	Fiber washer	VEC1254			
	19	Door spring	VBH1167			
	20	Volume knob	VNK1539			
	21	Screw	BPZ26P060FCU			
	22	Screw	BPZ26P080FMC			
	23	Screw	IPZ26P060FMC			
	24	Screw	PMZ20P040FCU			



1

2

3

4

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6

A

A

B

B

C

C

D

D

1

2

3

4

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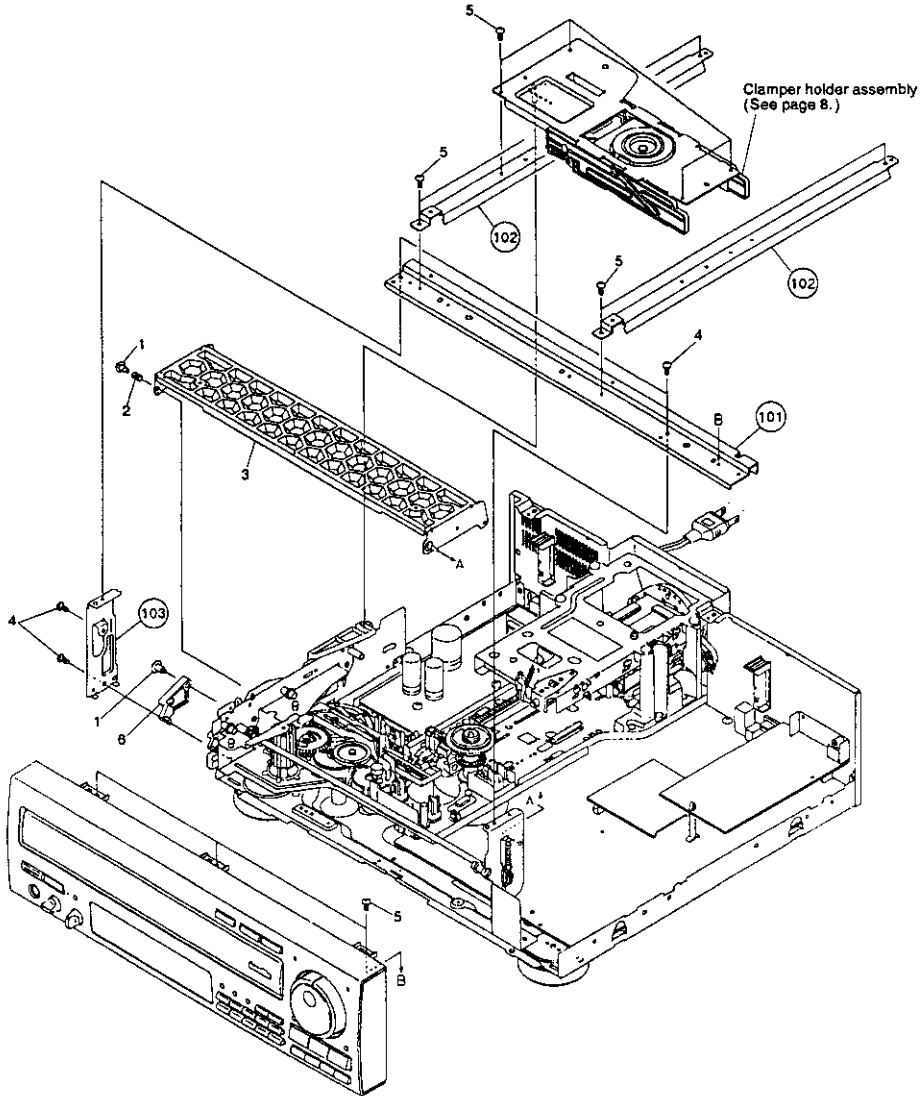
6

6

2.3 TOP VIEW SECTION

Parts List

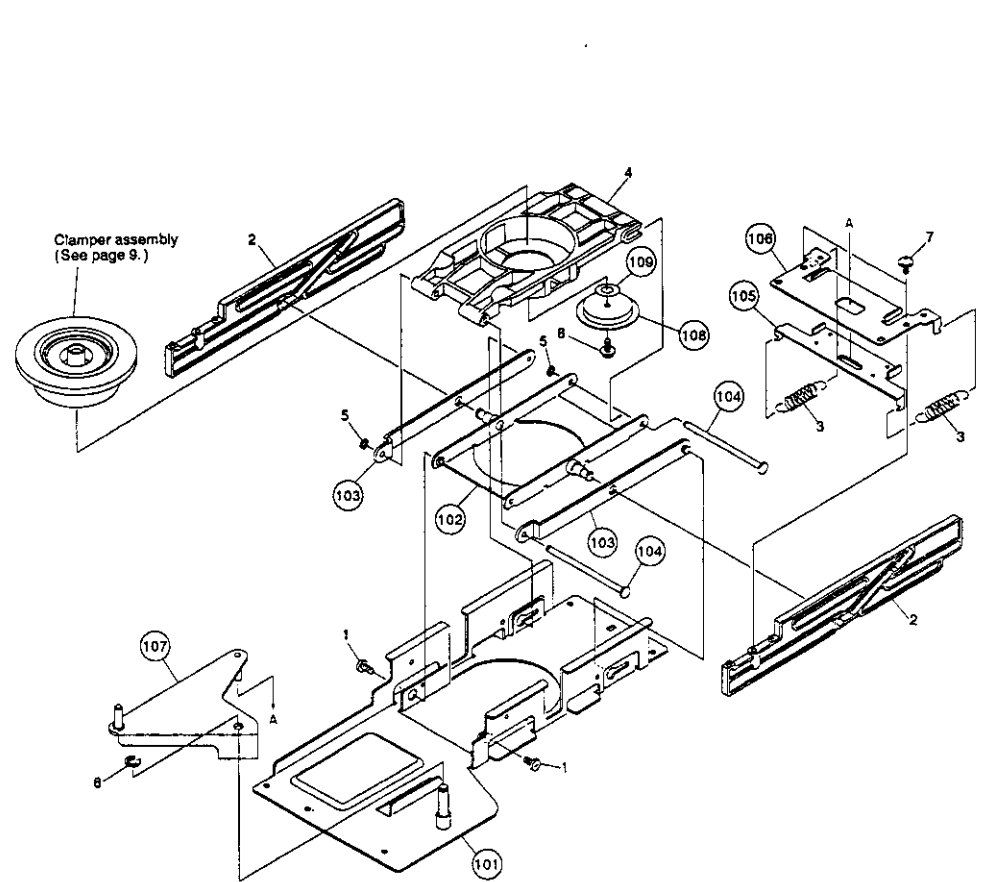
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Screw (B)	VBA1008	101	Front angle	
2	Arm spring	VBH1093	102	Center angle	
3	Tray guide assembly	VXA1576	103	Side stay (L)	
4	Screw	BBZ30P060FCC			
5	Screw	IBZ30P060FCC			
6	Door lever	VNL1330			



2.4 CLAMPER SECTION

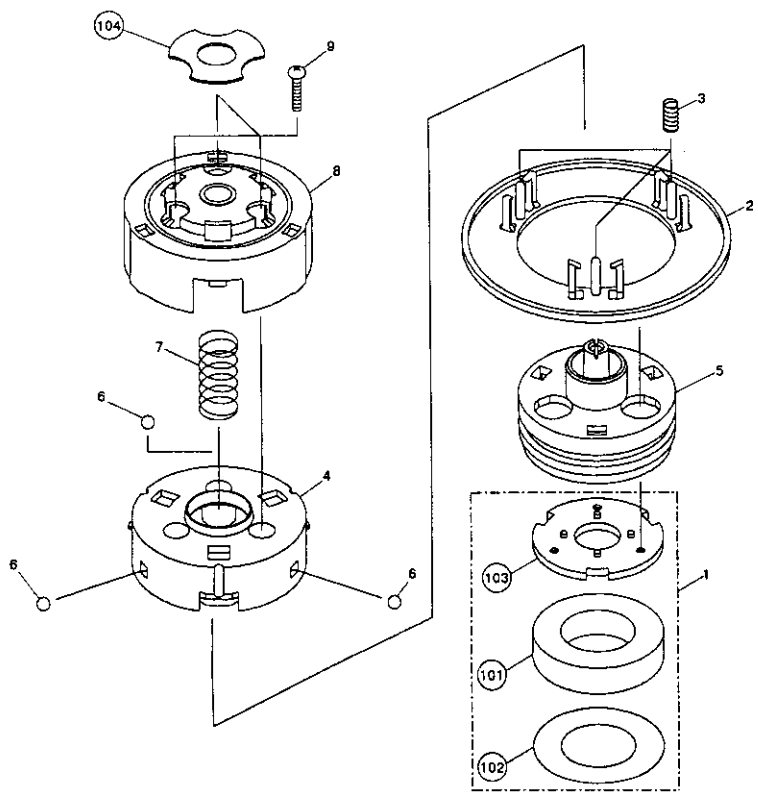
Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Pivot screw	VBA1022	101	Center plate assembly	
2	Clamp cam	VNL1306	102	Lever (B) assembly	
3	Limiter spring	VBH1168	103	Lever (A) assembly	
4	Clamper holder	VNL1305	104	Clamp shaft	
5	Washer	WT26D060D050	105	Limiter plate	
6	Stop ring	YE40FUC	106	Slide plate	
7	Screw	IPZ30P060FMC	107	Lever (C) assembly	
8	Screw	IPZ30P080FCC	108	Clamper head	
			109	Spacer	



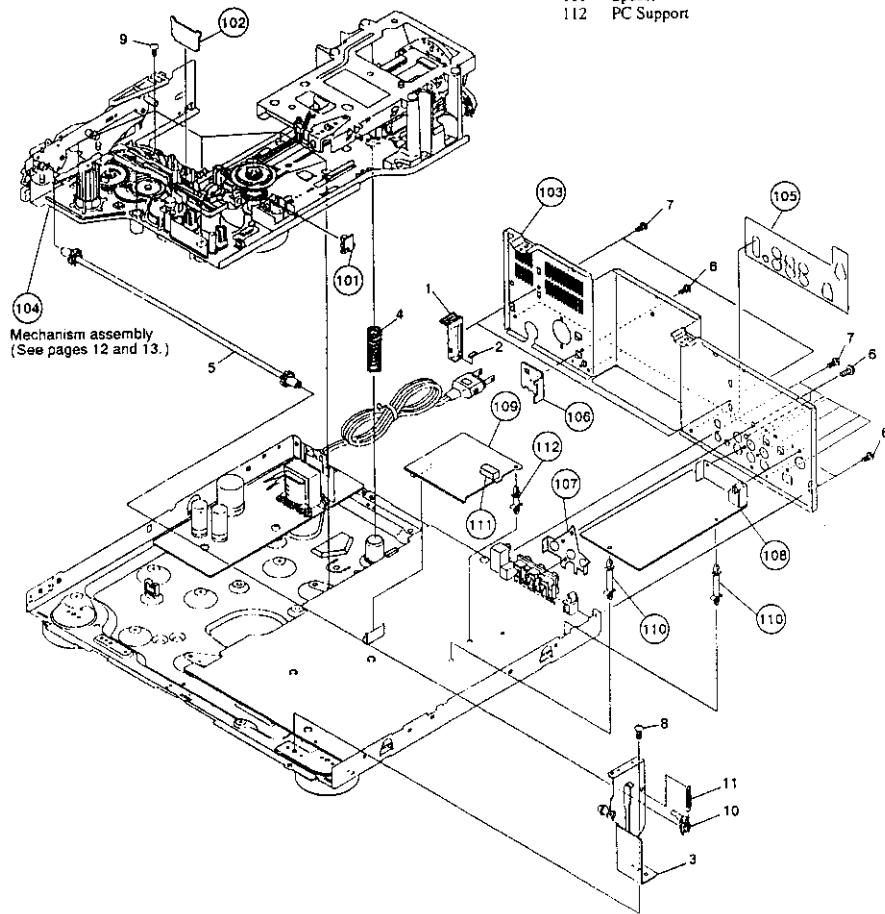
2.5 CLAMPER ASSEMBLY

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
1		Magnet assembly - S	VXX1475	101		Magnet	
2		Disc clamber	VNL1362	102		Gap sheet	
3		Clamber spring	VBH1153	103		Clamber plate	
4		Clamber base	VNL1364	104		Absorber rubber(A)	
5		Centering hab (B)	VNL1297				
6		Steel ball	VNX1006				
7		Centering spring (B)	VBH1130				
8		Clamber cover	VNL1363				
9		Screw	AMZ20P040FMC				



2.6 BASE SECTION (1)

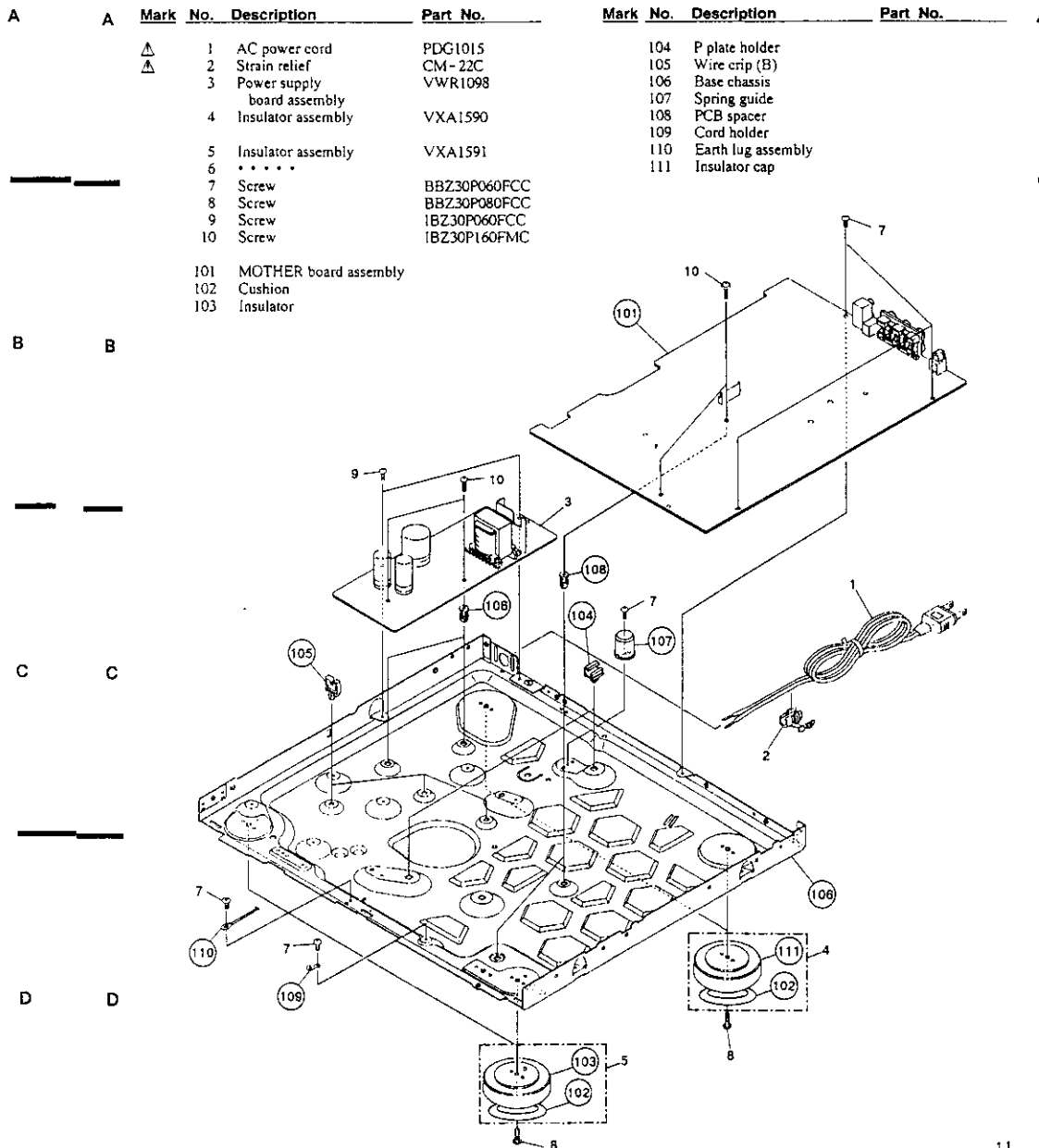
Parts List		Parts List			
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Tray stopper	VNL1202	101	FG board assembly	
2	Door dump rubber	VEB1033	102	SWITCH board assembly	
3	Side stay (R) assembly	VXA1492	103	Rear panel	
4	Base spring	VBH1145	104	Mechanism assembly	
5	Synchro gear assembly	VXA1627	105	Label (A)	
6	Screw	BBT30P060FCC	106	TB holder	
7	Screw	BPZ30P080FCU	107	6P earth plate	
8	Screw	BBZ30P060FCC	108	SYNR assembly	
9	Screw (B)	VBA1023	109	AFM assembly	
10	Synchro holder	VNL1334	110	PCB Support	
11	Synchro spring	VBH1139	111	Spacer	
			112	PC Support	



2.7 BASE SECTION (2)

Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	AC power cord	PDG1015	104	P plate holder	
2	Strain relief	CM-22C	105	Wire clip (B)	
3	Power supply board assembly	VWR1098	106	Base chassis	
4	Insulator assembly	VXA1590	107	Spring guide	
5	Insulator assembly	VXA1591	108	PCB spacer	
6	.....		109	Cord holder	
7	Screw	BBZ30P060FCC	110	Earth lug assembly	
8	Screw	BBZ30P080FCC	111	Insulator cap	
9	Screw	IBZ30P060FCC			
10	Screw	IBZ30P160FMC			
101	MOTHER board assembly				
102	Cushion				
103	Insulator				

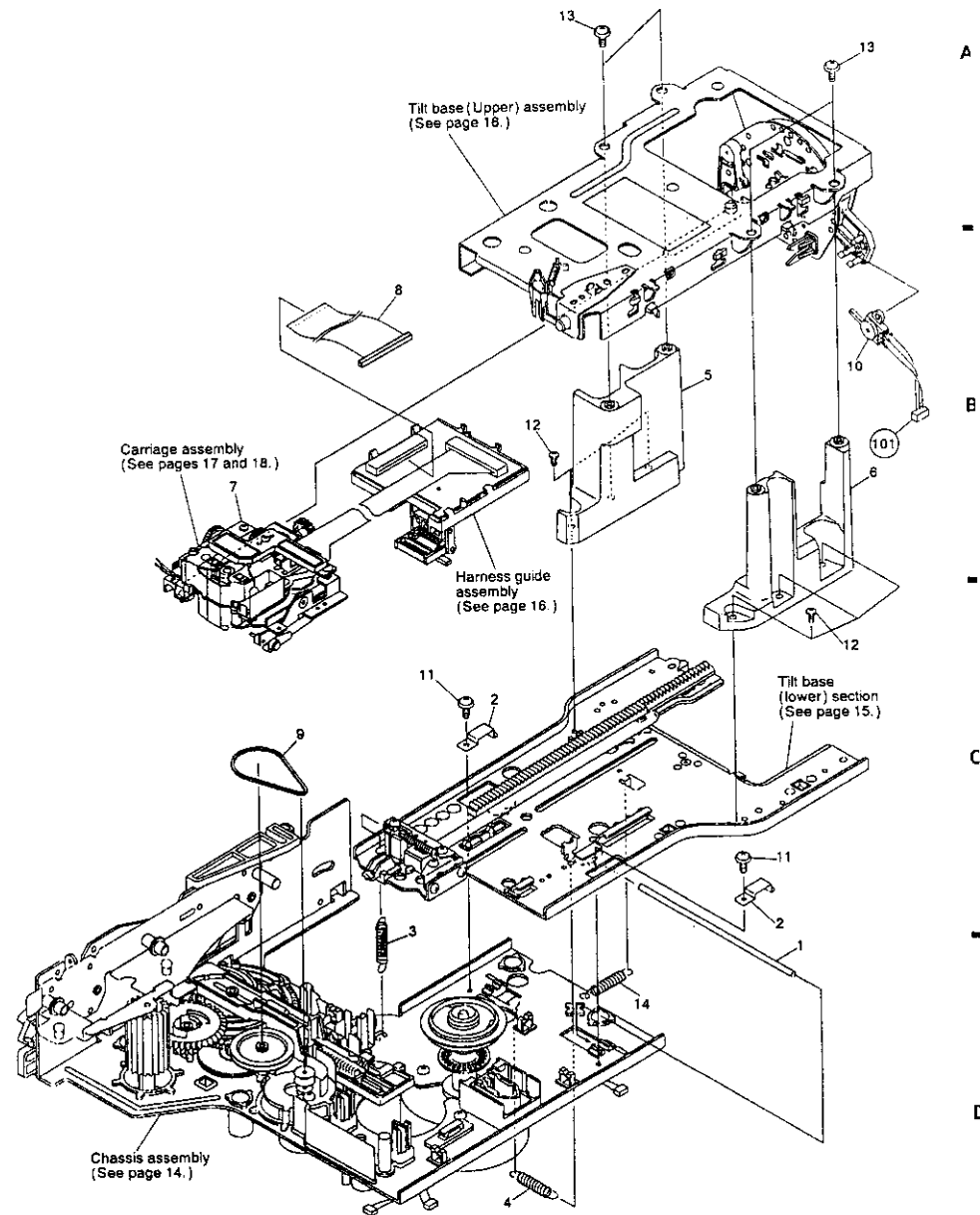


**2.8 MECHANISM ASSEMBLY**

**Parts List**

Mark No.	Description	Part No.
1	Tilt shaft	VLL1326
2	Plate spring	VBK1013
3	Tilt spring	VBH1146
4	Thrust spring	VBH1163
5	Post (L)	VNL1347
6	Post (R)	VNL1348
7	Carriage assembly	VWT1068
8	Flexible cable (22P)	VDA1329
9	Beir	PEB1013
10	Lever switch (TURN SW)	DSK1003

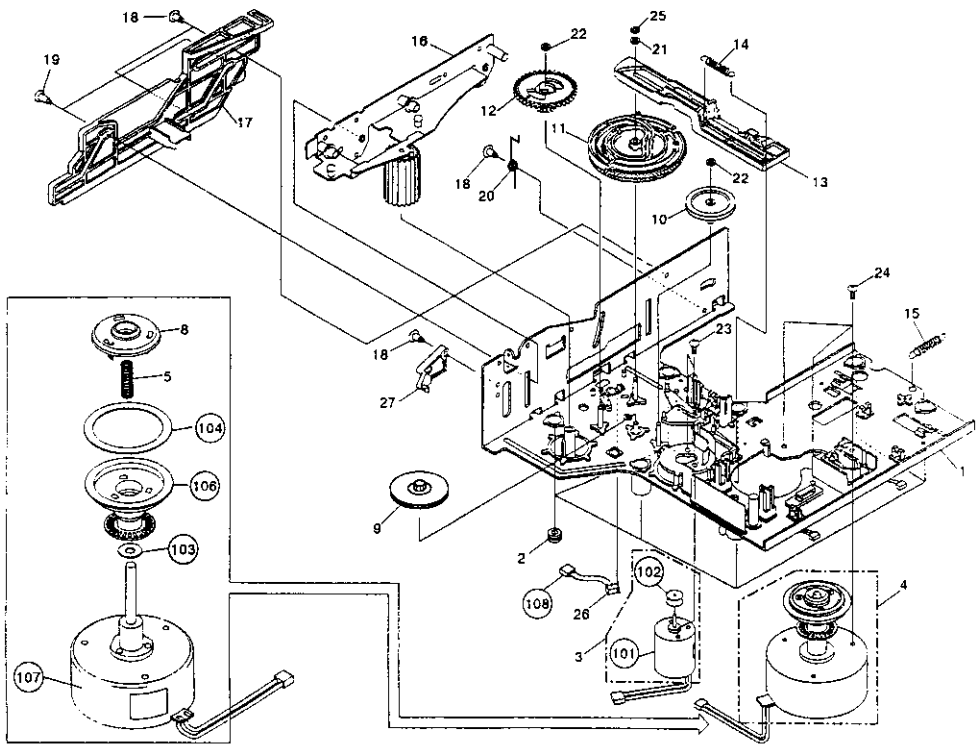
Mark No.	Description	Part No.
11	Screw	ABZ26P050FMC
12	Screw	IBZ30P100FMC
13	Screw	IPZ30P100FCU
14	Radial spring	VBH1164
101	Housing assembly (3P)	





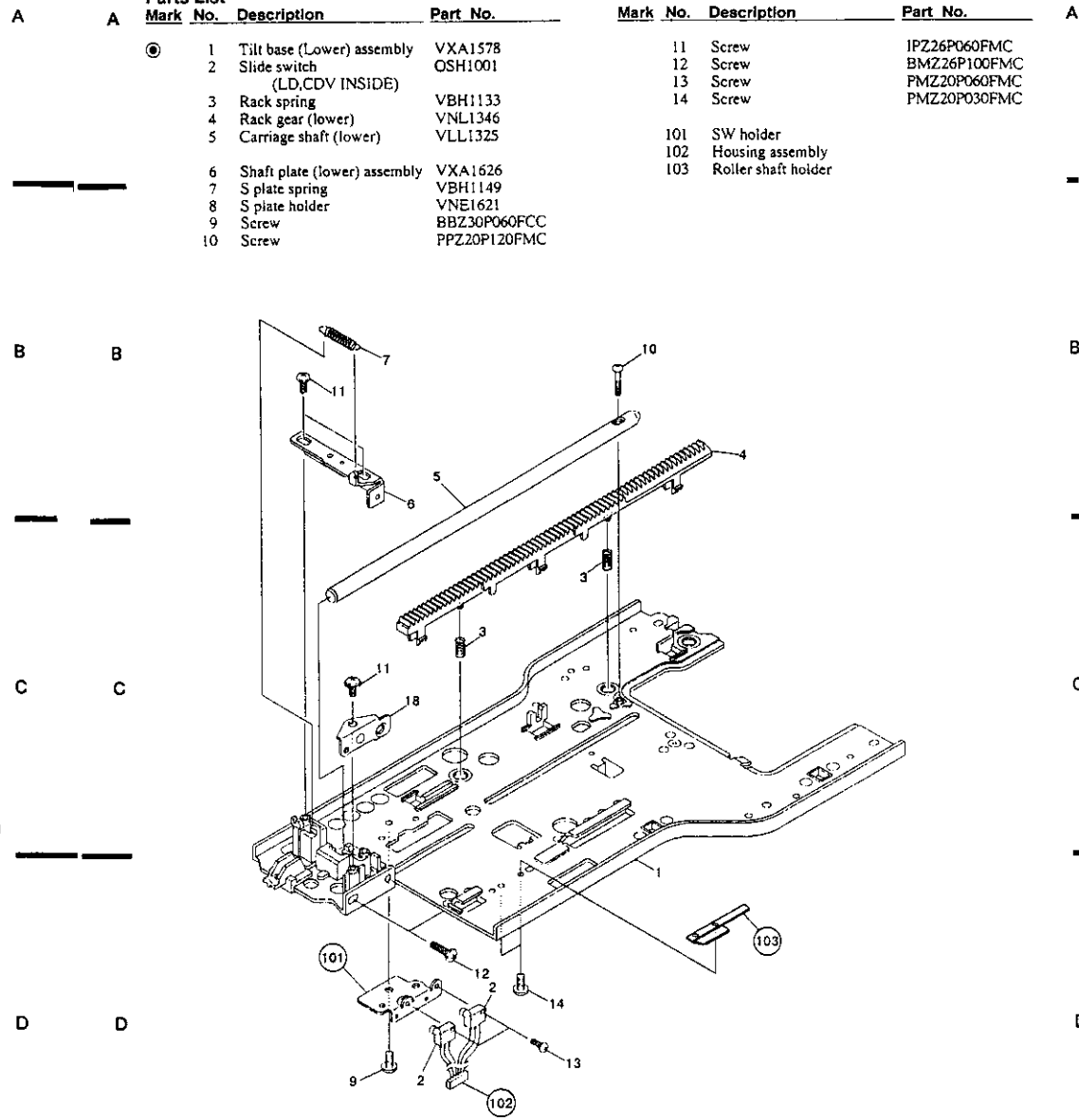
2.9 MECHANISM CHASSIS SECTION

Parts List			Parts List		
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Chassis assembly	VXA1577	21	Nylon washer	WA32N080W020
2	Rubber bushing	VEB1138	22	Washer	WT26D047D025
3	Loading motor assembly	VXX1262	23	Screw	PMZ30P040FCU
4	Spindle motor assembly	VXA1679	24	Screw	PMA30P050FCU
5	Centering spring	VBH1024	25	E ring 2,3	YE23FUC
6	Sheet	VEC1486	26	Push switch (TRAY SW)	DSG1014
7	Yoke plate A	VNE1360	27	Door lever	VNL1330
8	Centering hab (A)	VNL1296			
9	Two stair gear	VNL1326	101	Loading motor	
10	Gear pulley	VNL1249	102	Motor pulley	
11	Cam gear	VNL1350	103	Oil stopped washer	
12	Follow gear	VNL1317	104	Rubber sheet	
13	Spring slanting cam	VNL1316	105	Housing assembly	
14	Cam spring	VBH1082	106	Turn table assembly	
15	Radial spring	VBH1164	107	Spindle motor	
16	Roller plate assembly	VXA1493	108	Housing assembly	
17	Slide cam	VNL1304			
18	Screw (B)	VBA1008			
19	Screw (C)	VBA1015			
20	Return spring	VBH1129			



2.10 TILT BASE (LOWER) SECTION

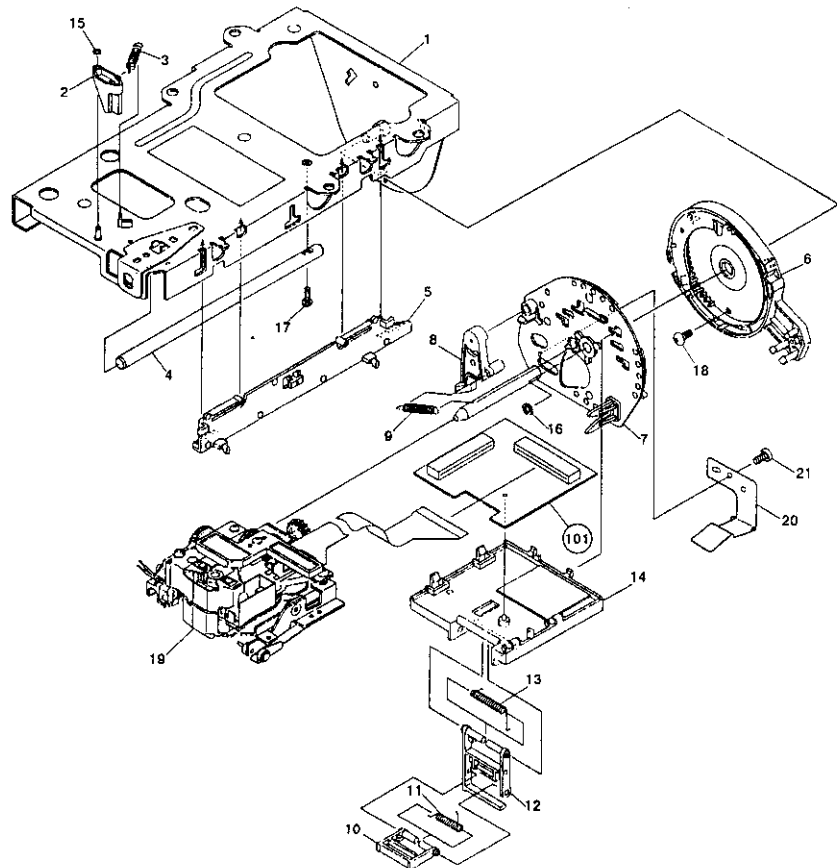
Parts List			Parts List		
Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Tilt base (Lower) assembly	VXA1578	11	Screw	IPZ26P060FMC
2	Slide switch (LD,CDV INSIDE)	OSH1001	12	Screw	BMZ26P100FMC
3	Rack spring	VBH1133	13	Screw	FMZ20P060FMC
4	Rack gear (lower)	VNL1346	14	Screw	PMZ20P030FMC
5	Carriage shaft (lower)	VLL1325	101	SW holder	
6	Shaft plate (lower) assembly	VXA1626	102	Housing assembly	
7	S plate spring	VBH1149	103	Roller shaft holder	
8	S plate holder	VNE1621			
9	Screw	BBZ30P060FCC			
10	Screw	PPZ20P120FMC			



2.11 TILT BASE (UPPER) SECTION

Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.	A
1	Tilt base (upper) assembly	VXA1580	11	Guide spring (B)	VBH1155	
2	SW lever	VNL1359	12	Harness guide (B)	VNL1408	
3	SW lever spring	VBH1150	13	Guide spring (A)	VBH1166	
4	Carriage shaft (upper)	VLL1324	14	Harness guide (A)	VNL1349	
5	Rack gear (upper)	VNL1345	15	Washer	WT16D032D025	
6	Internal gear assembly	VXA1491	16	Washer	WT36D072D050	
7	R plate assembly	VXA1579	17	Screw	PMZ20P120FMC	
8	Lock lever	VNL1351	18	Screw	BBZ26P050FCC	
9	Lever spring	VBH1127	19	Carriage assembly	VWT1068	
10	Harness guide (C)	VNL1361	20	Rock plate	VBK1026	
			21	Screw	IBZ20P040FCC	
			101	CNNB assembly		

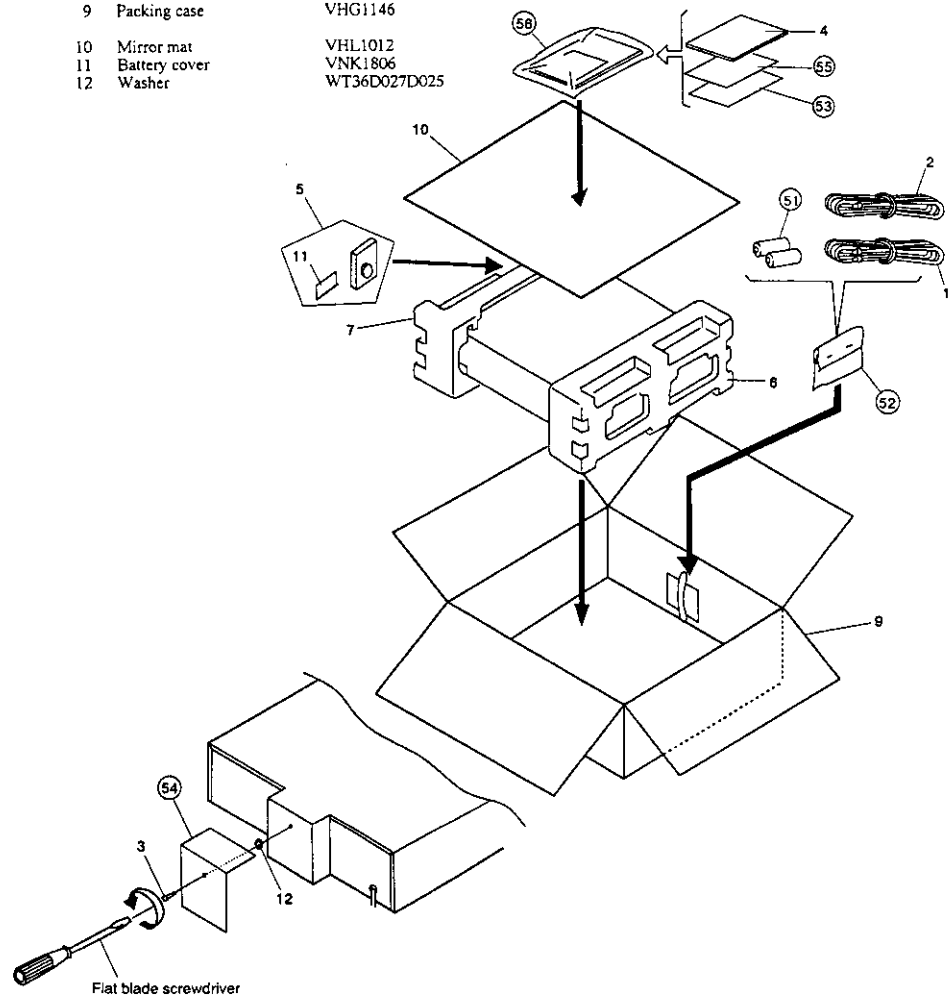




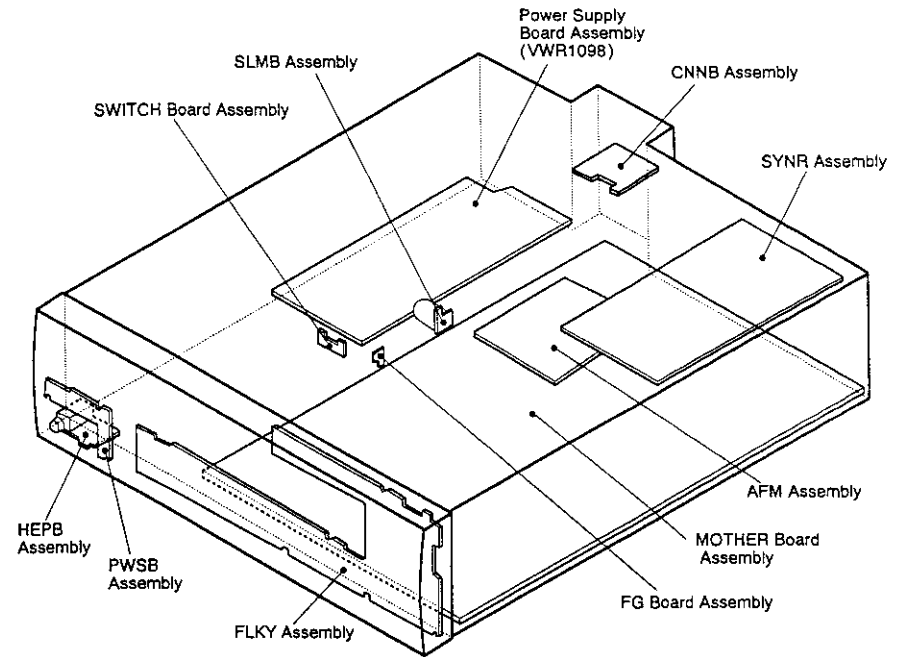
### 3. PACKING

#### Parts List

Mark No.	Description	Part No.	Mark No.	Description	Part No.
1	Connection cord	VDE-055	51	Dry cell battery (R03, AAA)	
2	Video cable	VDE-056	52	Polyethylene bag	
3	Transit screw (RED)	VLL1358	53	Caution card	
4	Operating instructions (English)	VRB1043	54	Tack card	
			55	Caution card (UC)	
5	Remote control unit (CU-CLD038)	VXX1538	56	Polyethylene bag	
6	Pad (F)	VHA1070			
7	Pad (R)	VHA1071			
8	.....				
9	Packing case	VHG1146			
10	Mirror mat	VHL1012			
11	Battery cover	VNK1806			
12	Washer	WT36D027D025			



### 4. P. C. BOARDS LOCATION



#### MAIN BOARD ASSEMBLY (VWM1156)

MAIN board assembly is composed of MOTHER, FG and SWITCH board assemblies.

#### FLKB ASSEMBLY (VWM1104)

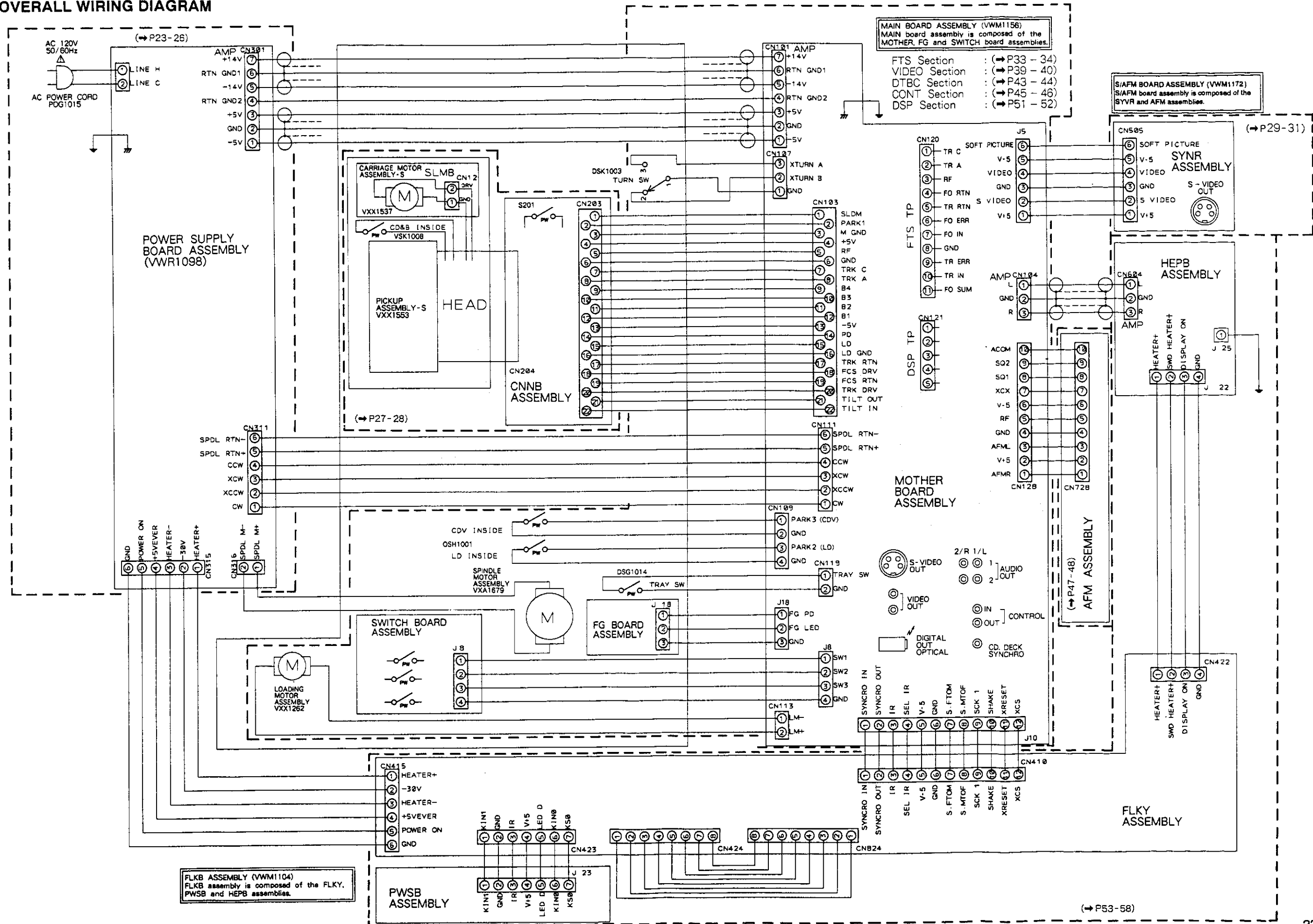
FLKB assembly is composed of FLKY, PWSB and HEPB assemblies.

#### S/AFM BOARD ASSEMBLY (VWM1172)

S/AFM board assembly is composed SYNR and AFM assemblies.

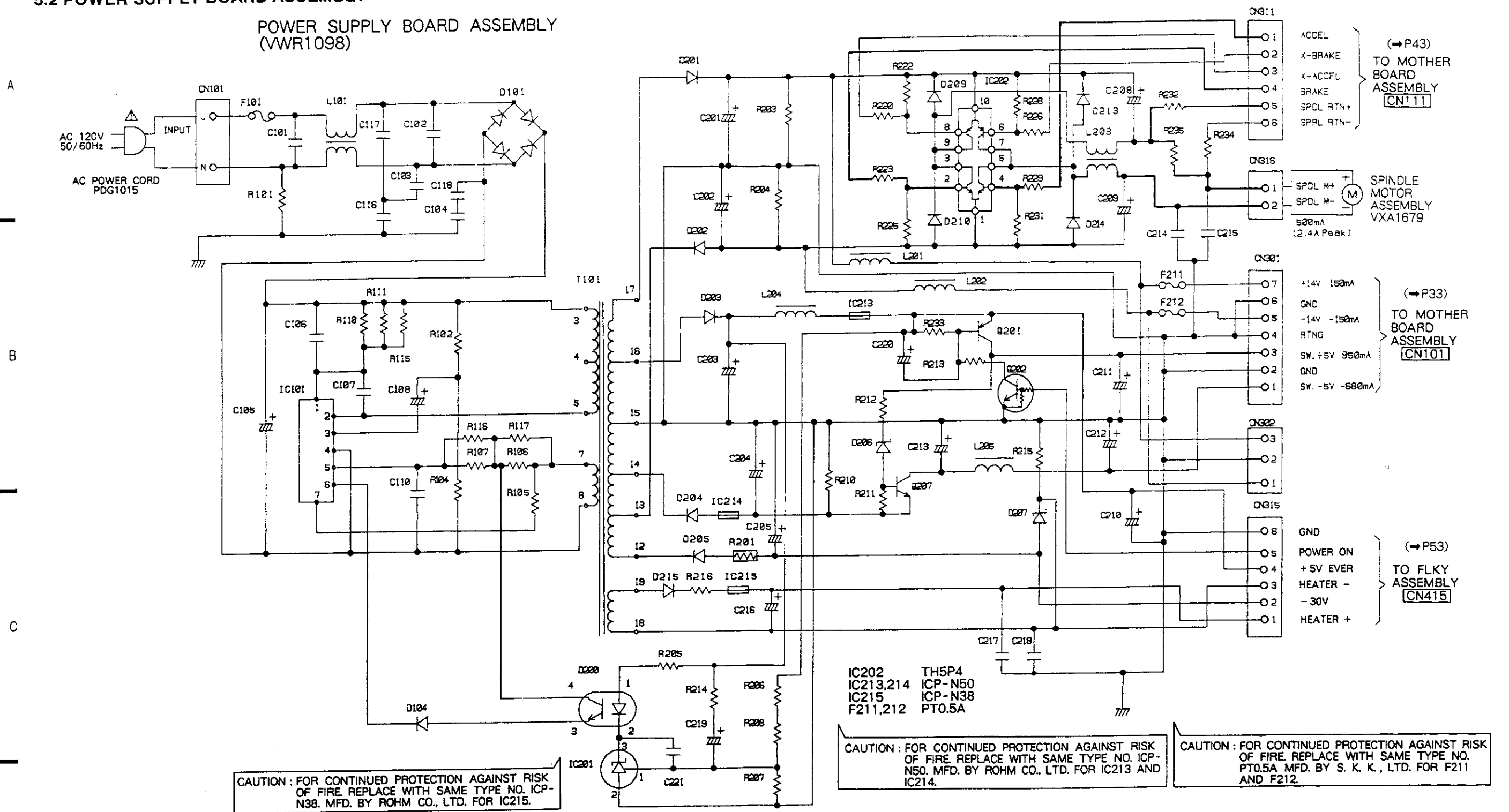
# 5. SCHEMATIC AND P.C.BOARDS DIAGRAM

## 5.1 OVERALL WIRING DIAGRAM



5.2 POWER SUPPLY BOARD ASSEMBLY

POWER SUPPLY BOARD ASSEMBLY  
(VWR1098)



1. RESISTORS:

Indicated in  $\Omega$ , 1/4W, 1/8W and 1/8W,  $\pm 5\%$  tolerance unless otherwise noted k; k $\Omega$ , M; M $\Omega$ , (F);  $\pm 1\%$ , (G);  $\pm 2\%$ , (K);  $\pm 10\%$ , (M);  $\pm 20\%$  tolerance.

2. CAPACITORS:

Indicated in capacity ( $\mu$ F) / voltage(V) unless otherwise noted p;pF. Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:

$\square$  :DC voltage (V) at no input signal.  
Value in ( ) is DC voltage at rated power.  
 $\ominus$  mA :DC current at no input signal.

4. OTHERS:

$\rightarrow$  :Signal route.  
 $\odot$  :Adjusting point.  
The  $\Delta$  mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.  
\* marked capacitors and resistors have parts numbers.

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES : (The underlined indicates the switch position)

- OUTSIDE OF P.C. BOARDS  
Push switch :TRAY SW  
Lever switch :TURN SW  
Slide switch :LD, CDV INSIDE  
Slide switch :CD, B INSIDE
- FLKY ASSEMBLY  
S101 :DOOR  
S102 :1  
S103 :SINGLE  
S104 :PGM  
S105 :9  
S106 :4  
S107 :+10  
S108 :0  
S109 :8  
S110 :3  
S111 :PEAK SEARCH  
S112 :6

- S113 :7  
S114 :2  
S115 :EDIT  
S116 :5  
S117 :RANDOM PLAY  
S118 :OPEN / CLOSE ( $\Delta$ )  
S119 :ONE SHOT MEMORY  
S120 :SKIP ( $\leftarrow$ )  
S121 :PLAY / STILL ( $\rightarrow$ )  
S122 :SIDE A  
S123 :INTRO SCAN  
S124 :STOP ( $\square$ )  
S125 :DIRECT CD  
S126 :SKIP ( $\rightarrow$ )  
S127 :DIGITAL MEMORY  
S128 :SIDE B  
S129 :JOG & SHUTTLE (REVERSE  $\curvearrowright$  FORWARD)

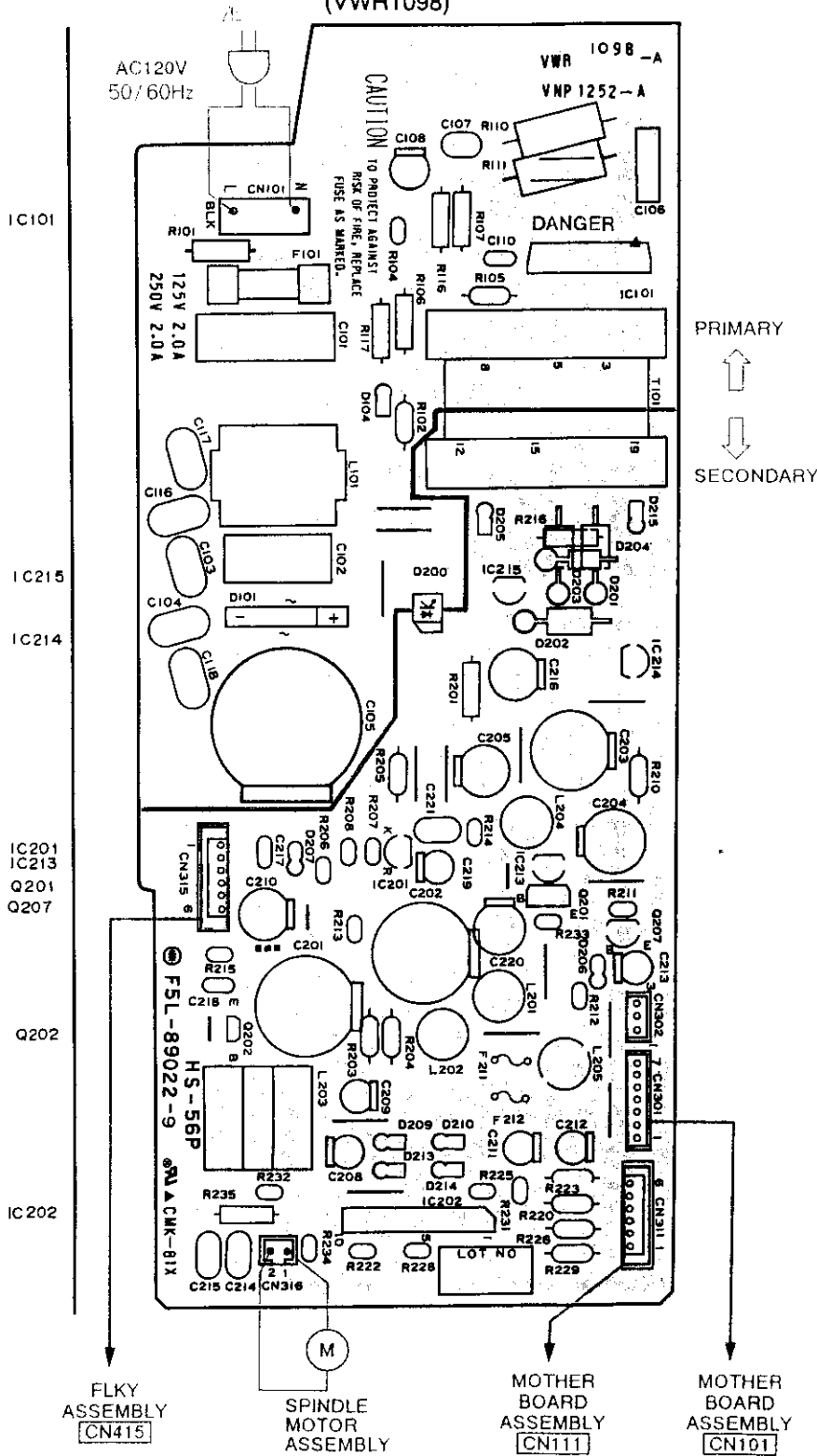
PWSB ASSEMBLY  
S301 :SOFT PICTURE  
S302 :POWER

CNNB ASSEMBLY  
S201 :

SWITCH BOARD ASSEMBLY  
S101 :LD  
S102 :CD  
S103 :CDV

$\text{---}$  :SPDL Servo Loop Line

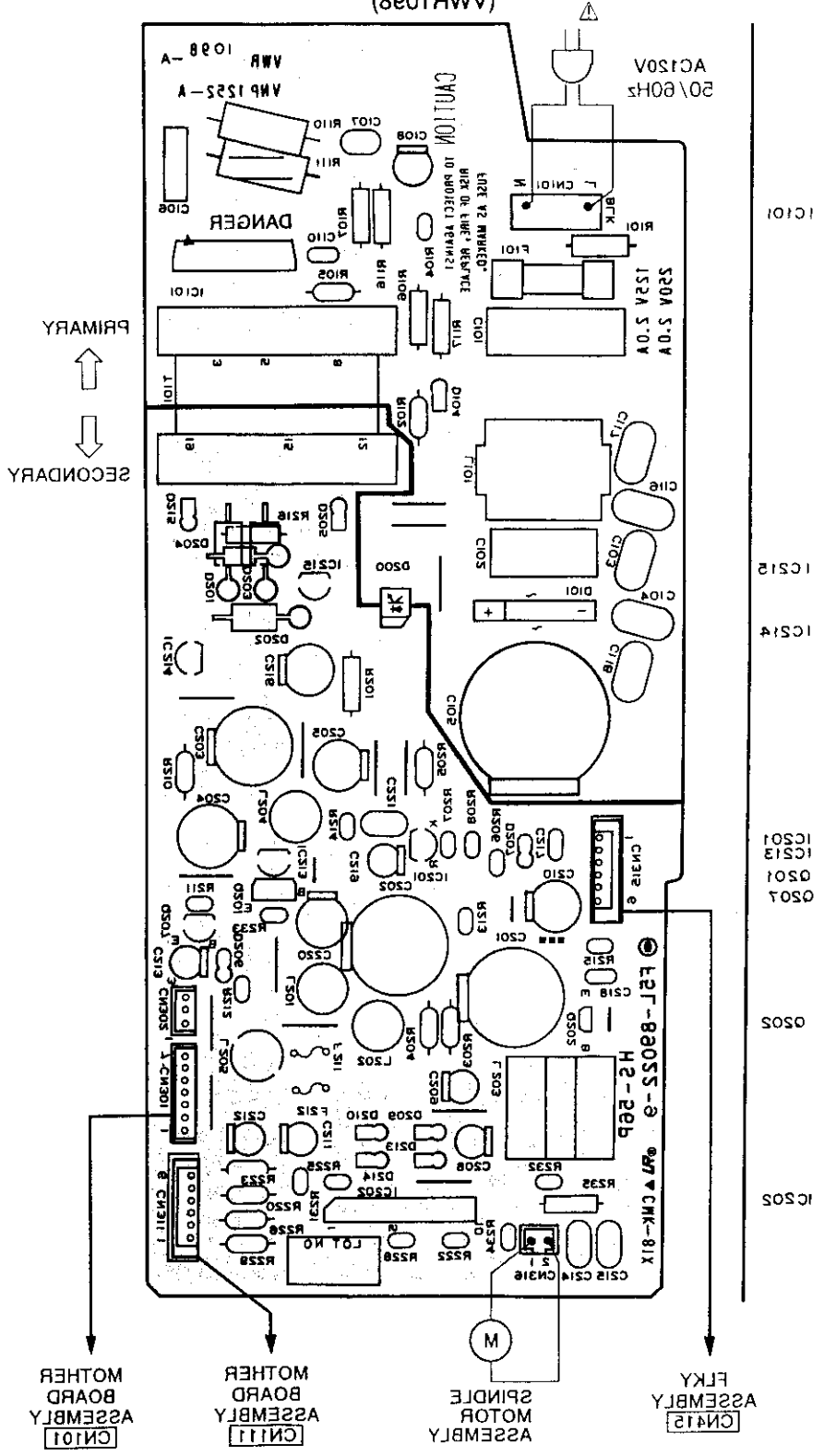
POWER SUPPLY BOARD ASSEMBLY  
(VWR1098)



P.C.B. pattern diagram indication	Corresponding part symbol	Part name
		Transformer
		FET
		Diode
		Zener diode
		LED
		Varactor
		Tact switch
		Inductor
		Coil
		Transformer
		Filter
		Ceramic capacitor
		Mylar capacitor
		StyroI capacitor
		Electrolytic capacitor (Non polarized)
		Electrolytic capacitor (Nonleakless)
		Electrolytic capacitor (Polarized)
		Electrolytic capacitor (Polarized)
		Power capacitor
		Semi-fixed resistor
		Resistor array
		Resistor
		Resonator
		Thermistor

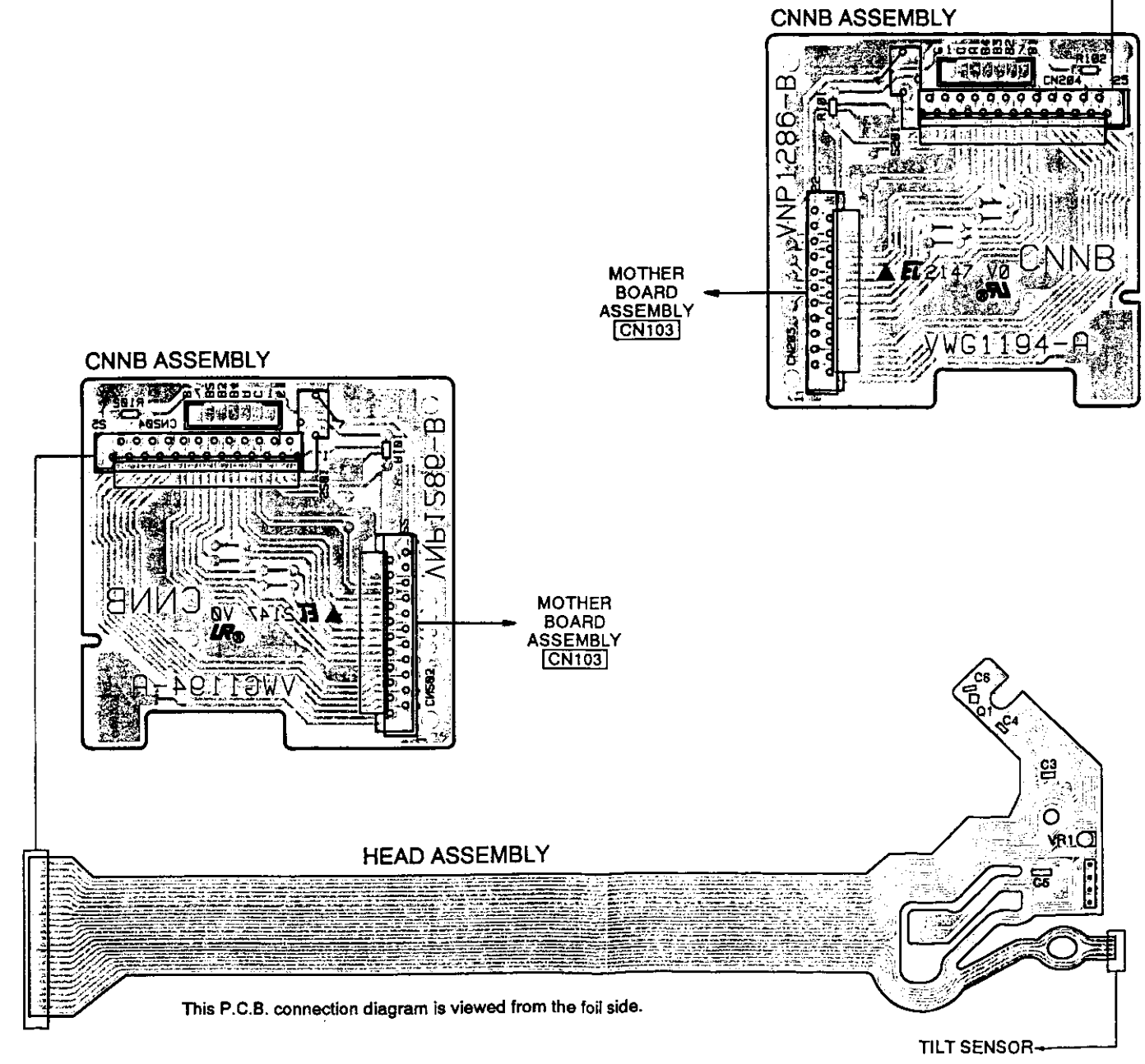
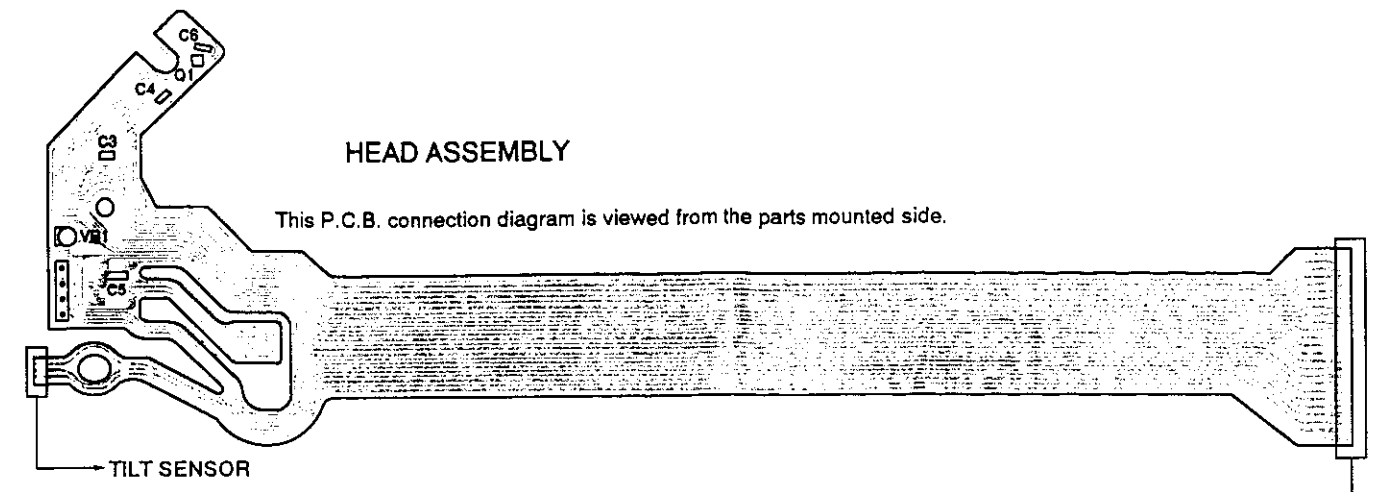
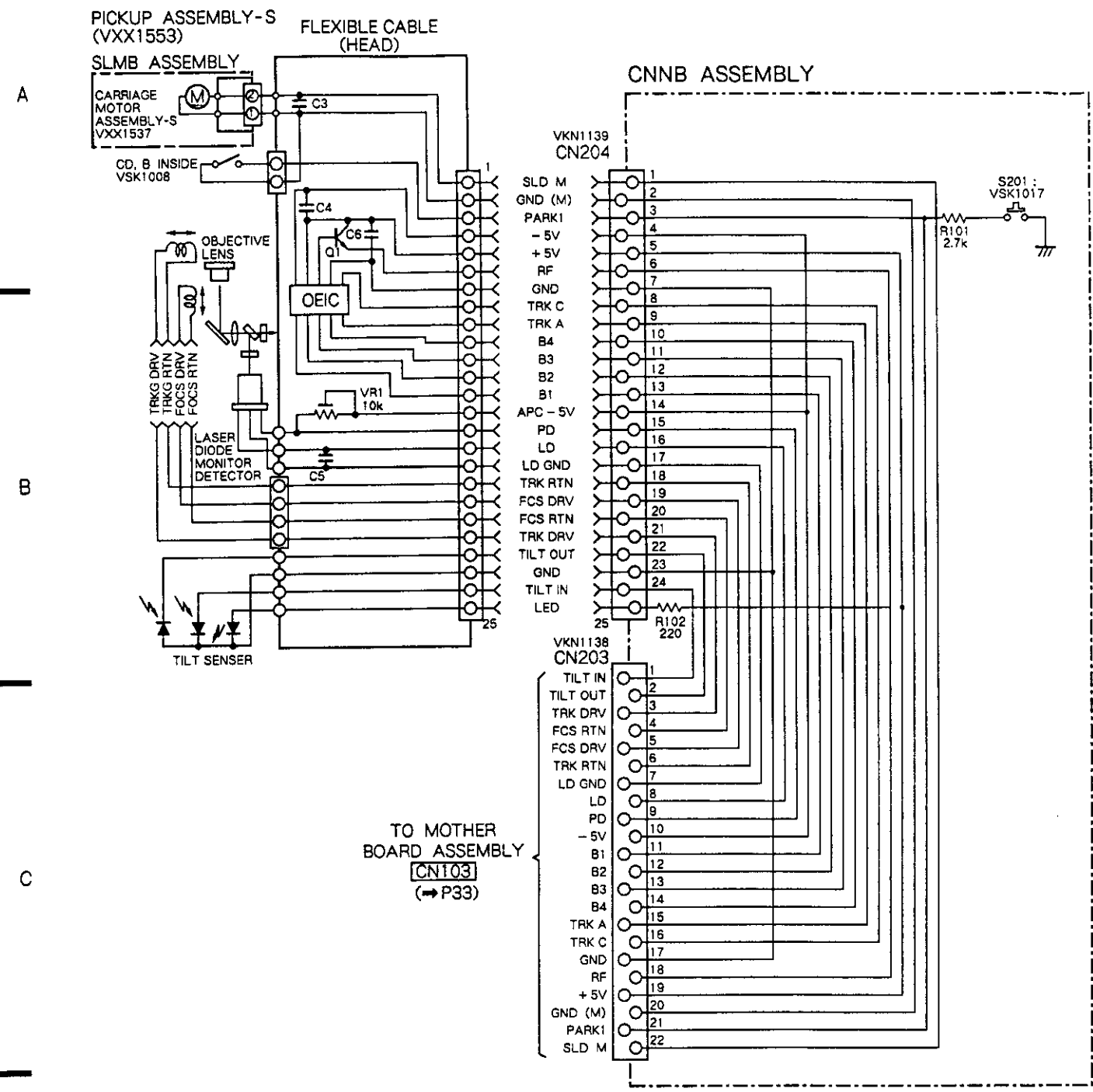
1. This P.C.B. connection diagram is viewed from the parts mounted side.
2. The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
3. The capacitor terminal marked with shows negative terminal.
4. The diode marked with shows cathode side.
5. The transistor terminal marked with shows emitter.

POWER SUPPLY BOARD ASSEMBLY (VWR108)





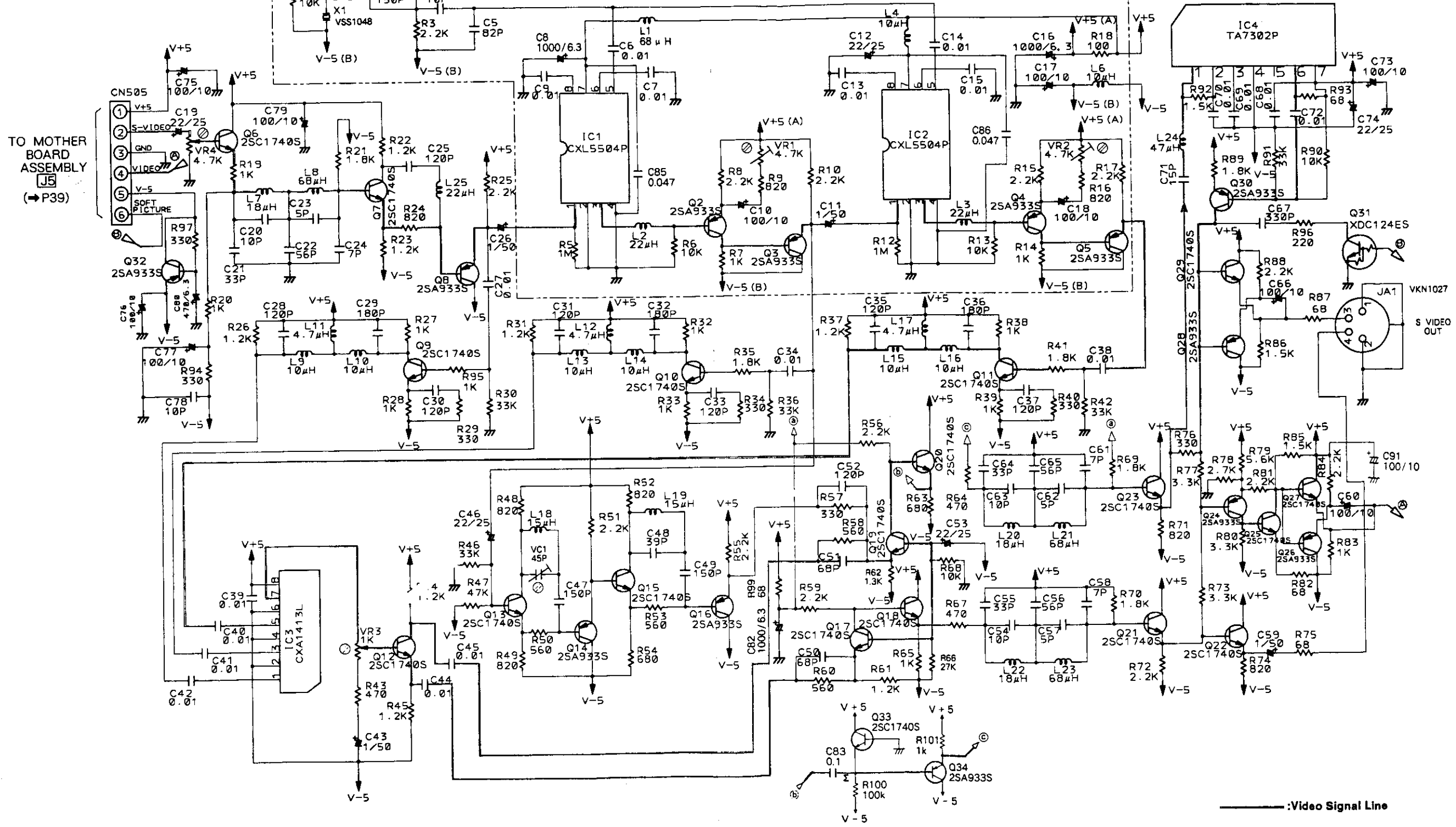
5.3 PICKUP AND CNNB ASSEMBLIES



5.4 SYNCR ASSEMBLY

SYNR ASSEMBLY

- VR1,2,4 : VRTB6VS472
- VR3 : VRTB6VS102
- VC1 : VCM1002
- L4,6,9,10,13-16 : LAU180J
- L2,3,25 : LAU220J
- L7,20,22 : L7.20.22
- L1,8,21,23 : L1.8.21.23
- L11,12,17 : L11.12.17
- L18,19 : L18.19
- L24 : L24
- : LAU180J
- : LAU680J
- : LAU4R7K
- : LAU150K
- : LAU470J



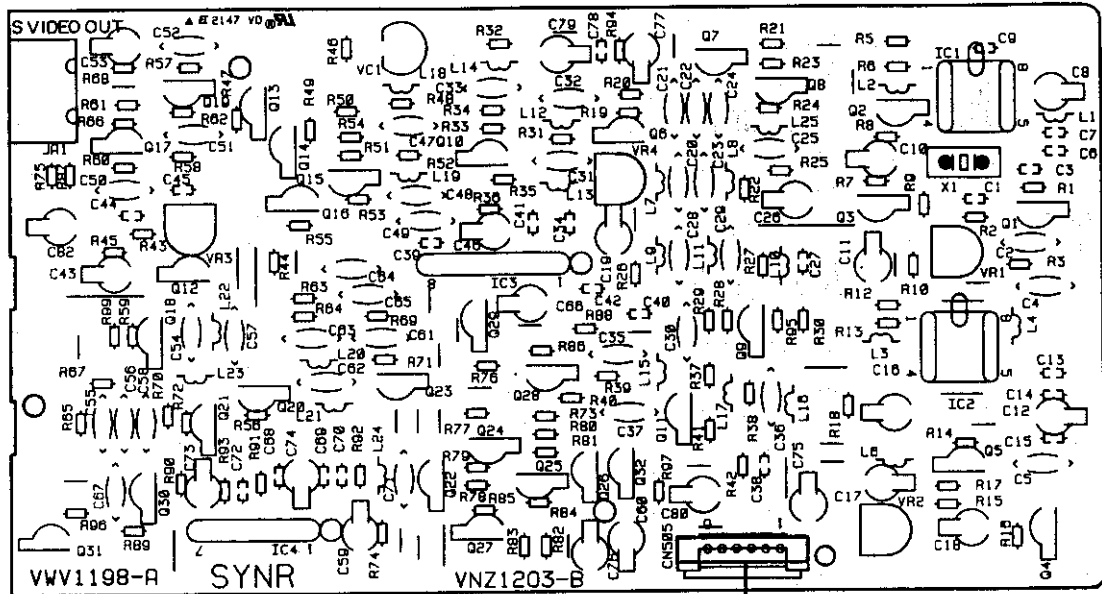
:Video Signal Line

SYNR ASSEMBLY

Q13-Q16  
 Q17-Q19 Q12 Q21 Q20  
 Q30 IC4  
 Q10 IC3  
 Q22-Q29  
 Q6  
 Q32  
 Q7  
 Q11  
 Q8  
 Q9  
 Q2 IC2 IC1  
 Q3 Q5  
 Q1  
 Q4

VR3 VC1 VR4 VR2 VR1

A



This P. C. B. connection diagram is viewed from the parts mounted side.

MOTHER BOARD ASSEMBLY  
 J5

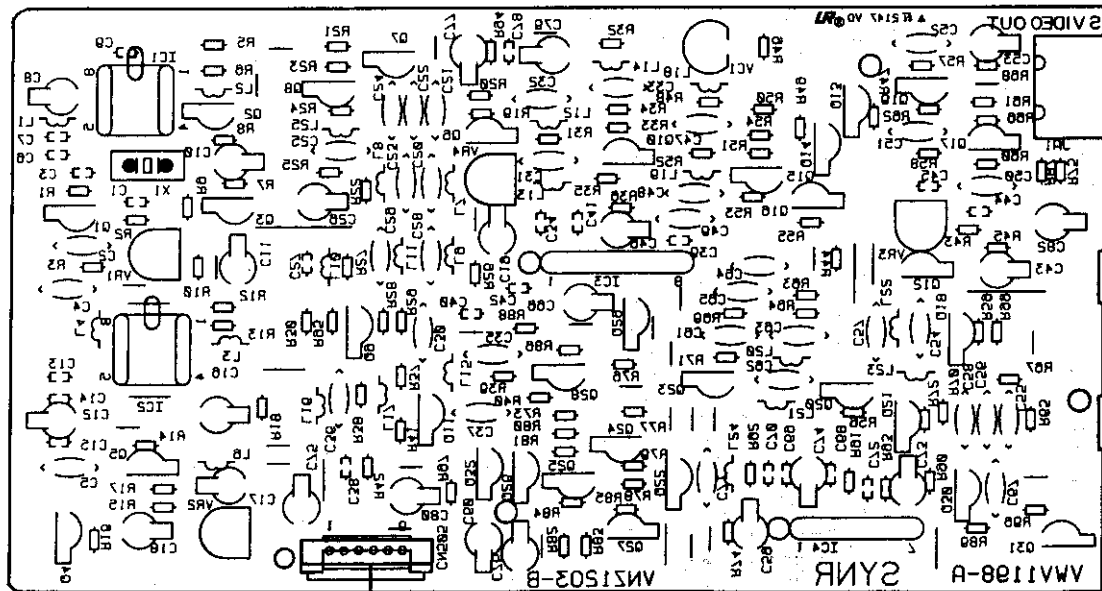
B

SYNR ASSEMBLY

Q13-Q16  
 Q17-Q19 Q12 Q21 Q20  
 Q30 IC4  
 Q10 IC3  
 Q22-Q29  
 Q6  
 Q32  
 Q7  
 Q11  
 Q8  
 Q9  
 Q2 IC2 IC1  
 Q3 Q5  
 Q1  
 Q4

VR3 VC1 VR4 VR2 VR1

C

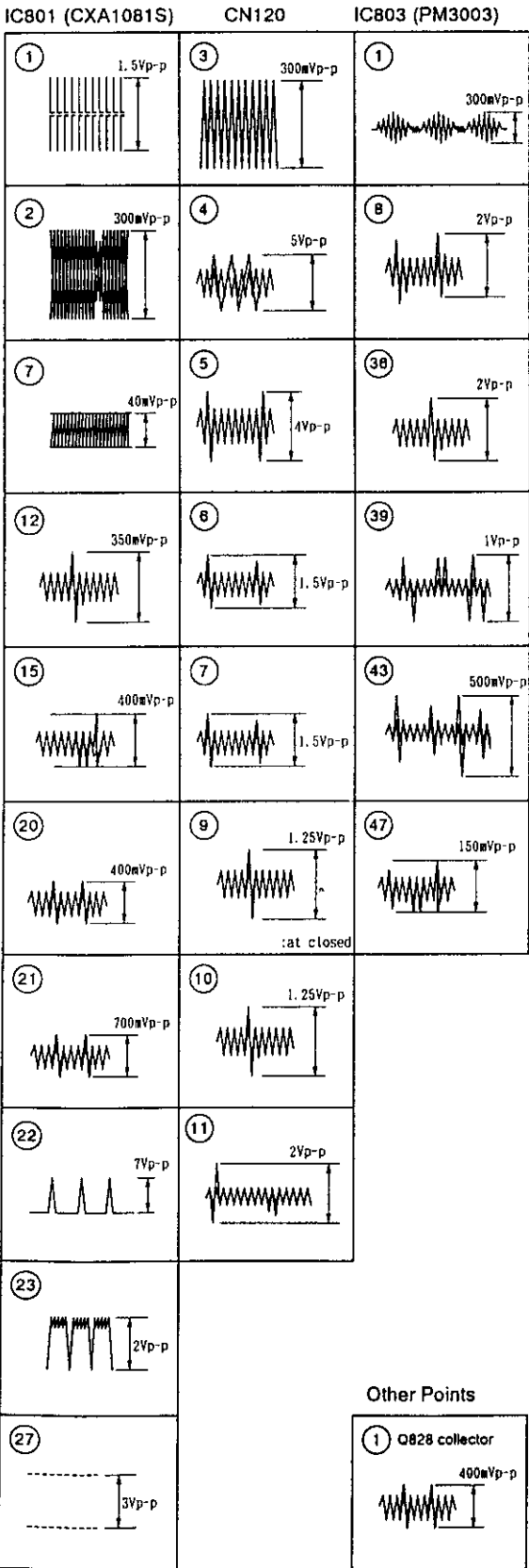


This P. C. B. connection diagram is viewed from the foil side.

MOTHER BOARD ASSEMBLY  
 J5

D

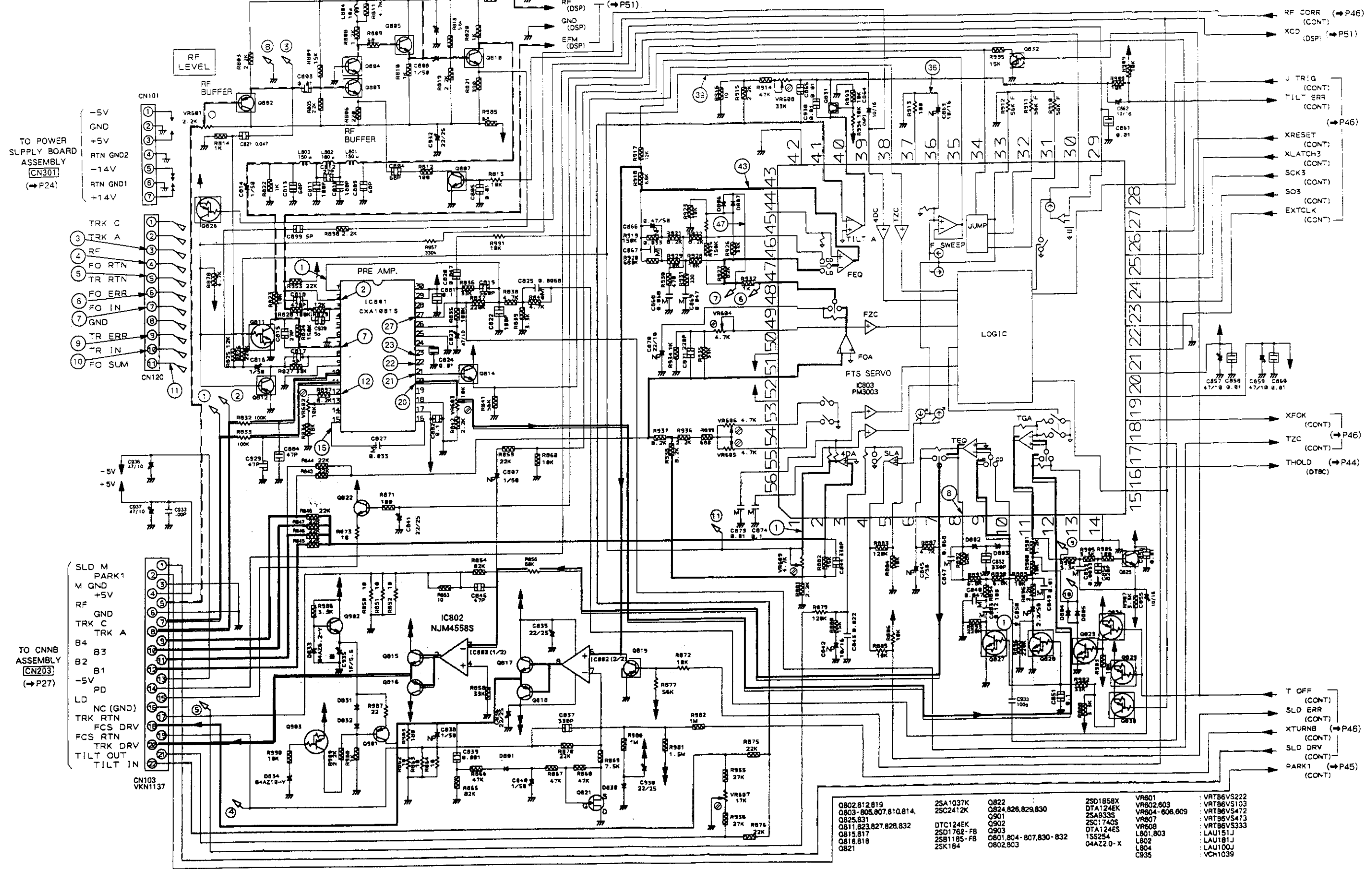
WAVEFORMS OF THE FTS SECTION



# 5.5 MOTHER BOARD ASSEMBLY (FTS SECTION)

MOTHER BOARD ASSRMBLY  
(FTS SECTION)

---:RF Signal Route  
 ---:FOCS Servo Loop Line  
 ---:TRKG Servo Loop Line  
 ---:TILT Servo Loop Line  
 ---:SLDR Motor Line



TO POWER  
SUPPLY BOARD  
ASSEMBLY  
[CN301]  
(P24)

TRK C  
TRK A  
RF  
FO RTN  
TR RTN  
FO ERR  
FO IN  
TR ERR  
TR IN  
FO SUM

-5V  
+5V

TO CNMB  
ASSEMBLY  
[CN203]  
(P27)

SLD M  
PARK1  
M GND  
+5V  
RF  
GND  
TRK C  
TRK A  
B4  
B3  
B2  
B1  
-5V  
PD  
LD  
NC (GND)  
TRK RTN  
FCS DRV  
FCS RTN  
TRK DRV  
TILT OUT  
TILT IN

Q802 812.819	2SA1037K	Q822	2SD1858X	VR601	VRT86VS222
Q803-805.807.810.814.	2SC2412K	Q824.826.829.830	DTA124EK	VR602.603	VRT86VS103
Q825.831		Q901	2SA335	VR604-606.609	VRT86VS472
Q811.823.827.828.832	DTC124EK	Q902	2SC1740S	VR607	VRT86VS473
Q815.817	2SD1762-FB	Q903	DTA124ES	VR608	VRT86VS333
Q818.818	2S81185-FB	Q801.804-807.830-832	1SS254	L801.803	L801.803
Q821	2SK184	Q802.803	04A22 0-X	L802	L804
				L804	L804
				C935	VCH1039

7 8 9 10 11 12

Line  
Line  
line

814D IC215	11SD	IC401	504D 304D	804D-104D	Q601-Q604	Q605-Q607	Q608 Q609	118D IC605	Q630	IC601	Q637	IC604
IC206 81SD-81SD	80SD-80SD	IC213 IC207 38D	IC210	Q419 114D	Q633	IC607	809D1	818D IC603	868D 868D	IC611	Q629	IC606
Q818	S1SD	IC205 IC211 IC208 118D	IC801	Q821 118D	IC202	80SD-10SD	IC204 168D	Q636	Q621 558D 558D	IC102	IC101	Q625-Q628
Q817 IC802	Q816	Q815	018D 108D 208D-38D	S18D 588D	168D	Q822 IC803 088D-128D	918D 858D-858D					058D
			VR601 VR607	VR521	VR609			VC901				VC602
			VR482 VR603	VR604-VR606								
			VR602	VR608								

(→ P46)

◆ P51

◆ P46

→ P46

→ P44

→ P46

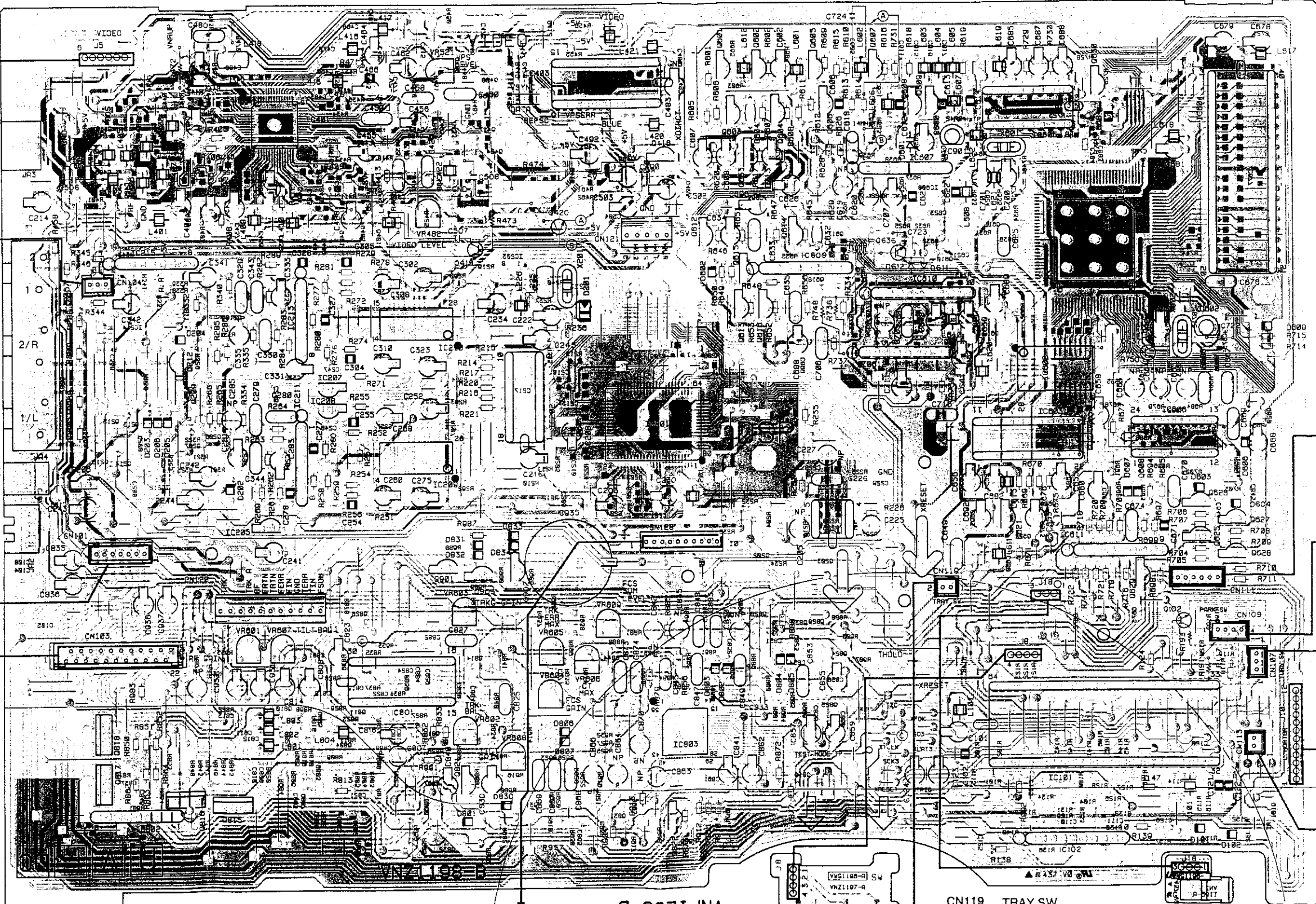
◆ P45

SYNR ASSEMBLY  
CN505

HEPB ASSEMBLY  
CN604

POWER SUPPLY BOARD ASSEMBLY  
CN301

CNNB ASSEMBLY  
CN203



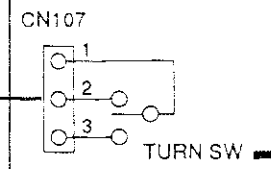
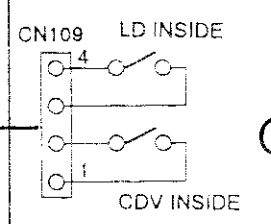
MOTHER BOARD ASSEMBLY

AFM ASSEMBLY  
CN728

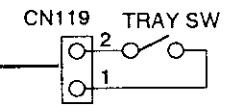
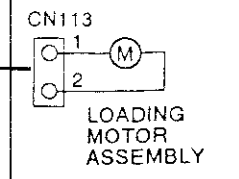
SWITCH BOARD ASSEMBLY  
VNP1296-B

FG BOARD ASSEMBLY

POWER SUPPLY BOARD ASSEMBLY  
CN311



FLKY ASSEMBLY  
CN410



A

B

C

D

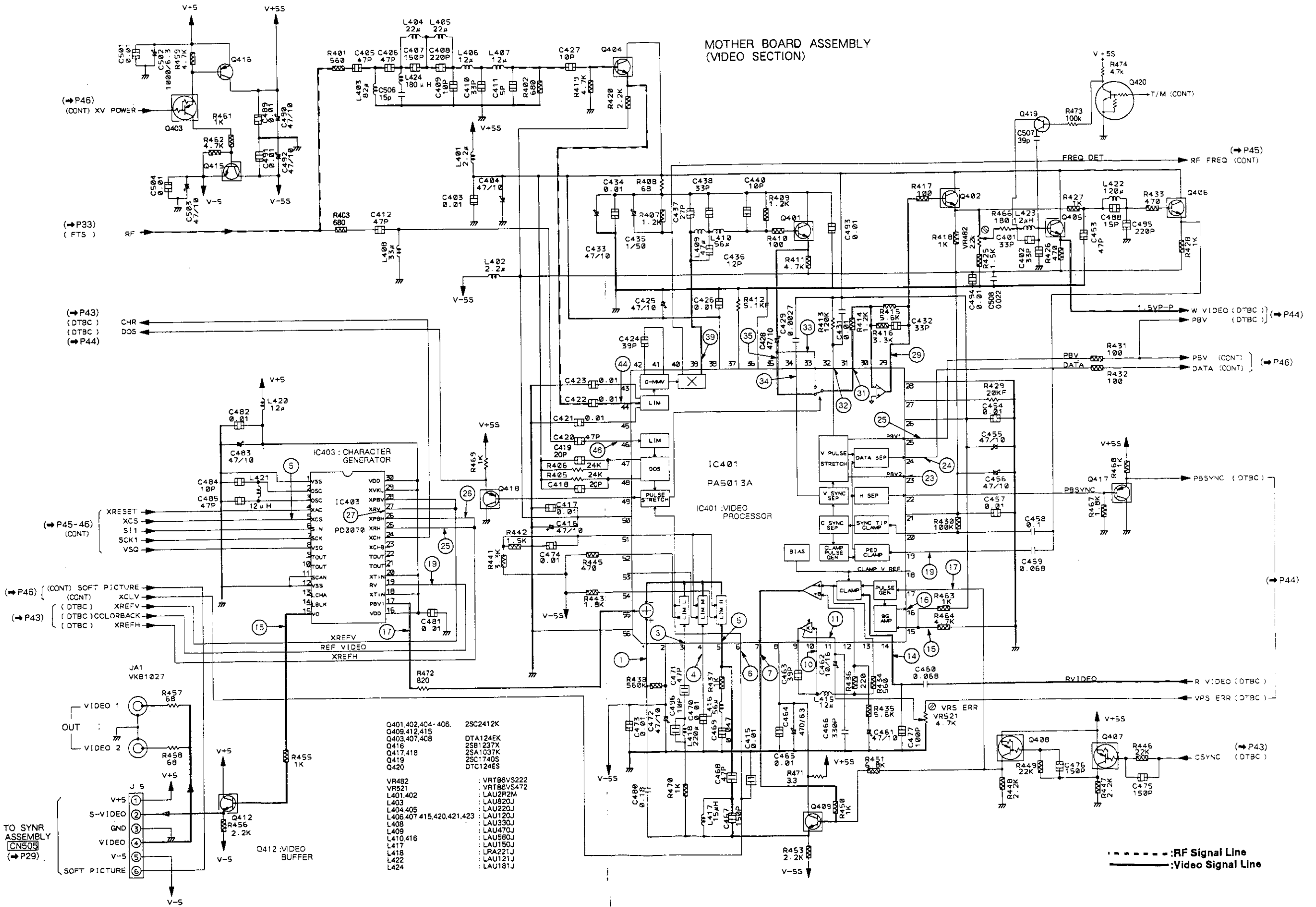
7 8 9 10 11 12





5.6 MOTHER BOARD ASSEMBLY (VIDEO SECTION)

MOTHER BOARD ASSEMBLY (VIDEO SECTION)



Q401,402,404-406,	2SC2412K
Q408,412,415	DTA124EK
Q403,407,408	2SB1237K
Q416	2SA1037K
Q417,418	2SC1740S
Q419	DTG124ES
Q420	
VR482	VRT86VS222
VR521	VRT86VS472
L401,402	LAU2R2M
L403	LAU820J
L404,405	LAU220J
L408,407,415,420,421,423	LAU120J
L408	LAU330J
L409	LAU470J
L410,416	LAU560J
L417	LAU150J
L418	LRA221J
L422	LAU121J
L424	LAU181J

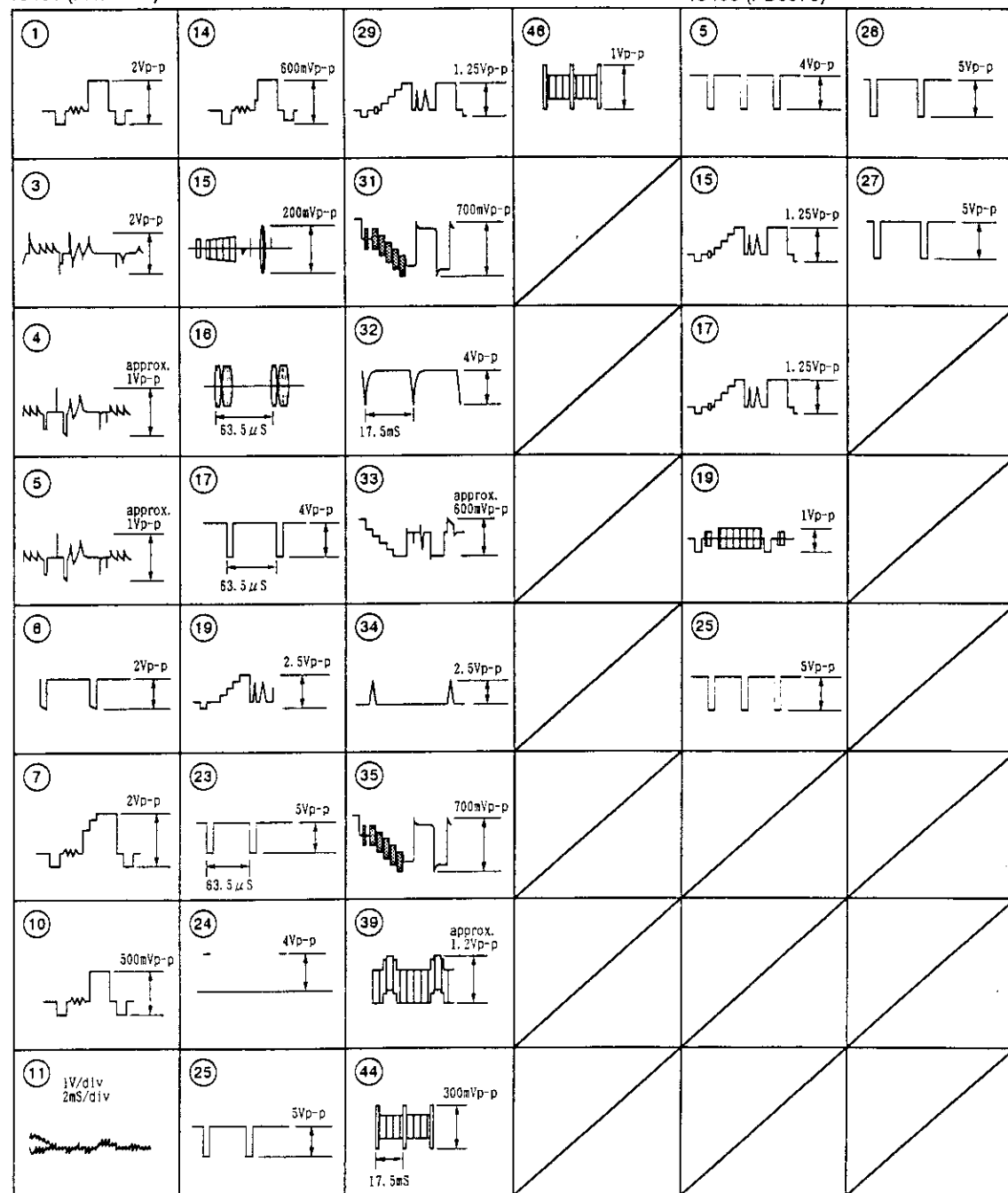
---:RF Signal Line  
 ---:Video Signal Line



WAVEFORMS OF THE VIDEO SECTION

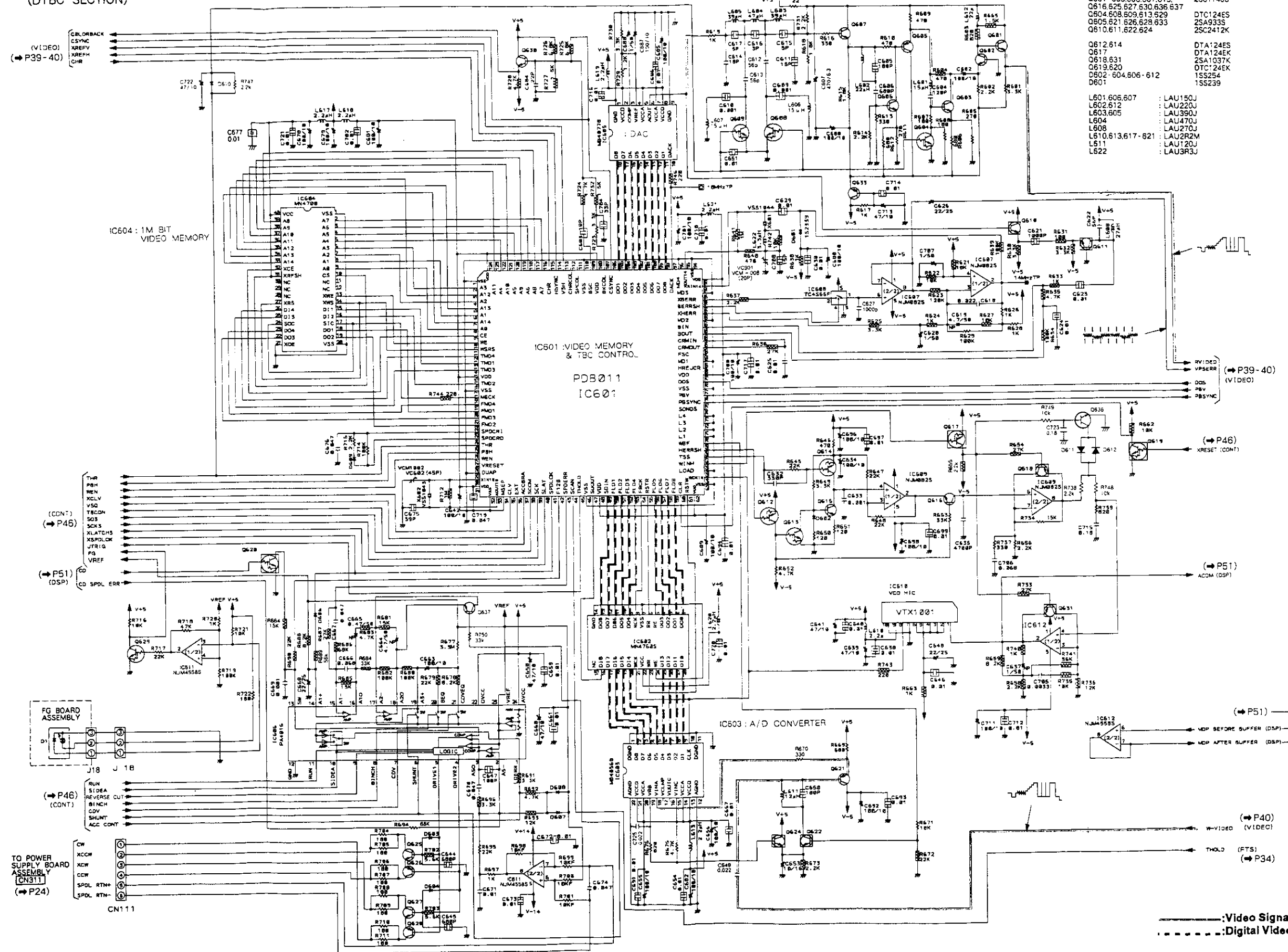
IC401 (PA5013A)

IC403 (PD0070)



5.7 MOTHER BOARD (DTBC SECTION) AND FG BOARD ASSEMBLIES

MOTHER BOARD ASSEMBLY (DTBC SECTION)



- Q601-603,606,607,615, 2SC1740S
- Q616,625,627,630,636,637
- Q604,608,609,613,629 DTC124ES
- Q605,621,626,628,633 2SA933S
- Q610,611,622,624 2SC2412K
- Q612,614 DTA124ES
- Q617 DTA124EK
- Q618,631 2SA1037K
- Q619,620 DTC124EK
- D602-604,606-612 1SS254
- D601 1SS239
- L601,605,607 LAU150J
- L602,612 LAU220J
- L603,605 LAU390J
- L604 LAU470J
- L608 LAU270J
- L610,613,617-621 LAU2R2M
- L611 LAU120J
- L622 LAU3R3J

(VIDEO) (P39-40)

IC604: 1M BIT VIDEO MEMORY

IC601: VIDEO MEMORY & TBC CONTROL PDB011 IC601

IC603: A/D CONVERTER

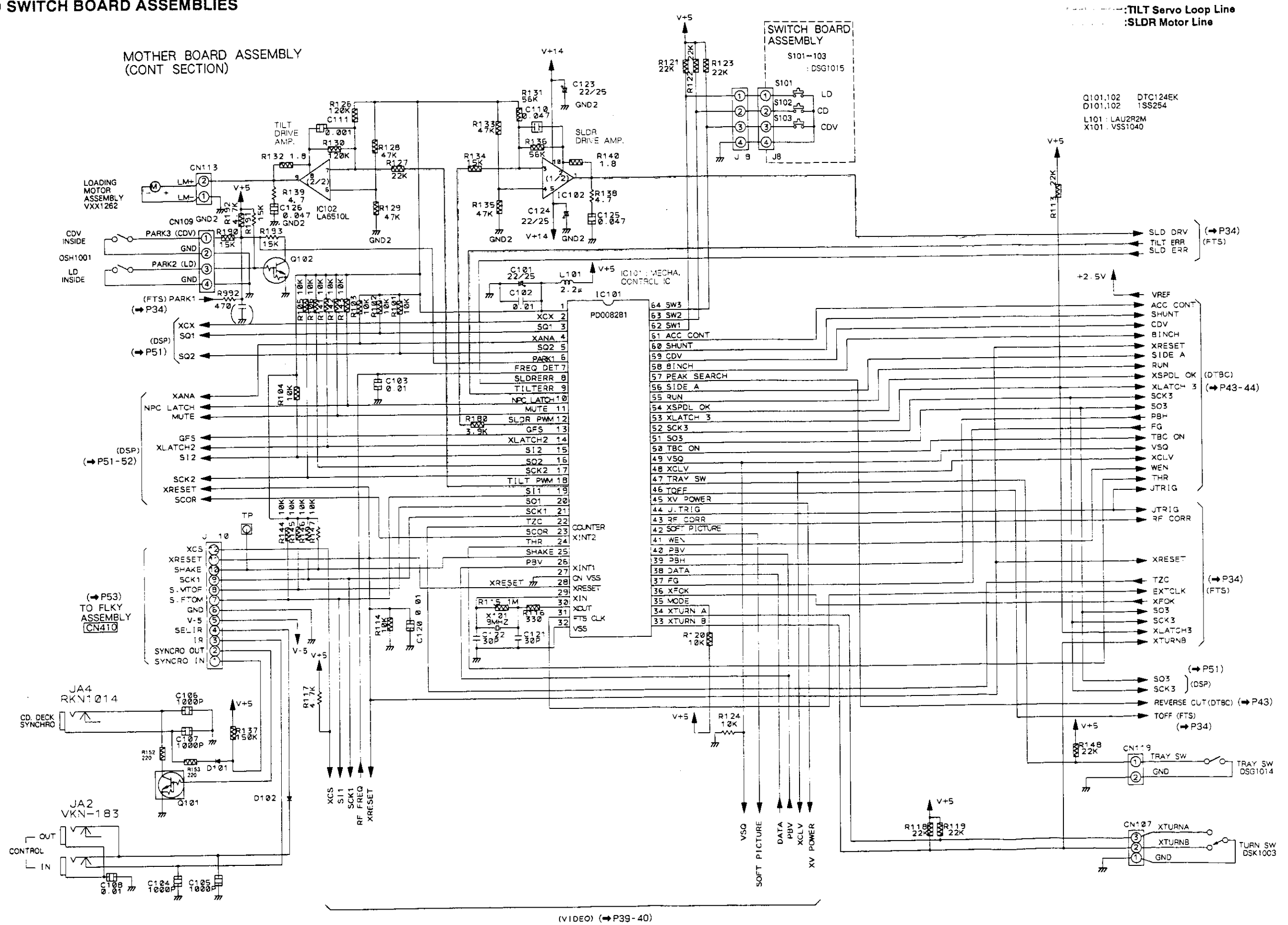
FG BOARD ASSEMBLY

TO POWER SUPPLY BOARD ASSEMBLY (CN311) (P24)

—:Video Signal Line  
- - -:Digital Video Signal Line

5.8 MOTHER BOARD (CONT SECTION) AND SWITCH BOARD ASSEMBLIES

MOTHER BOARD ASSEMBLY (CONT SECTION)

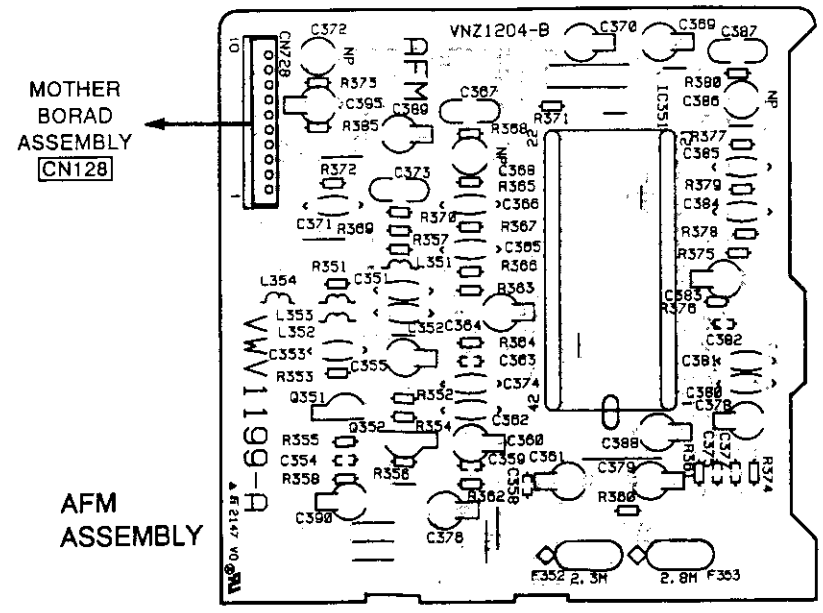
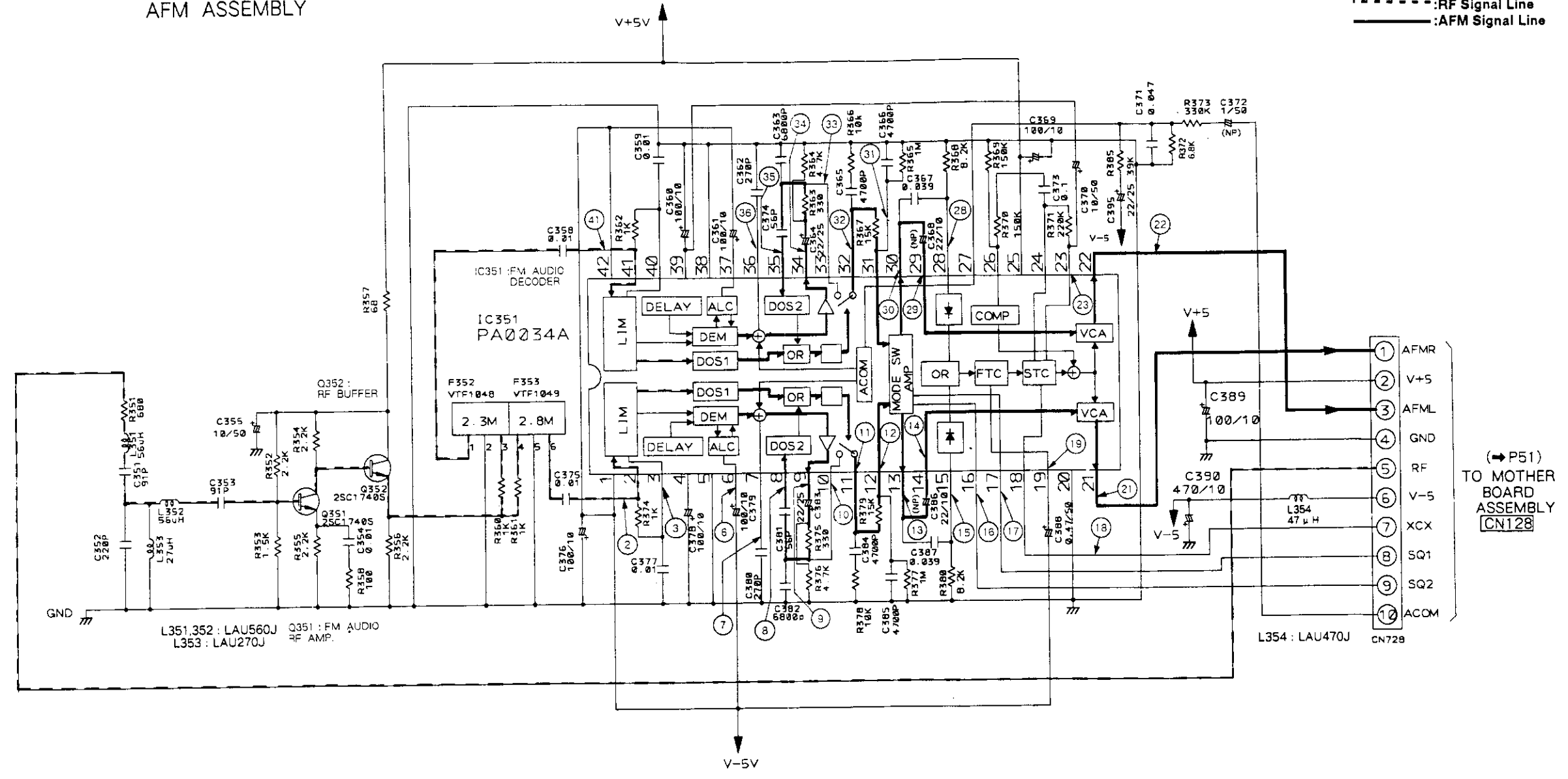


(VIDEO) (P39-40)

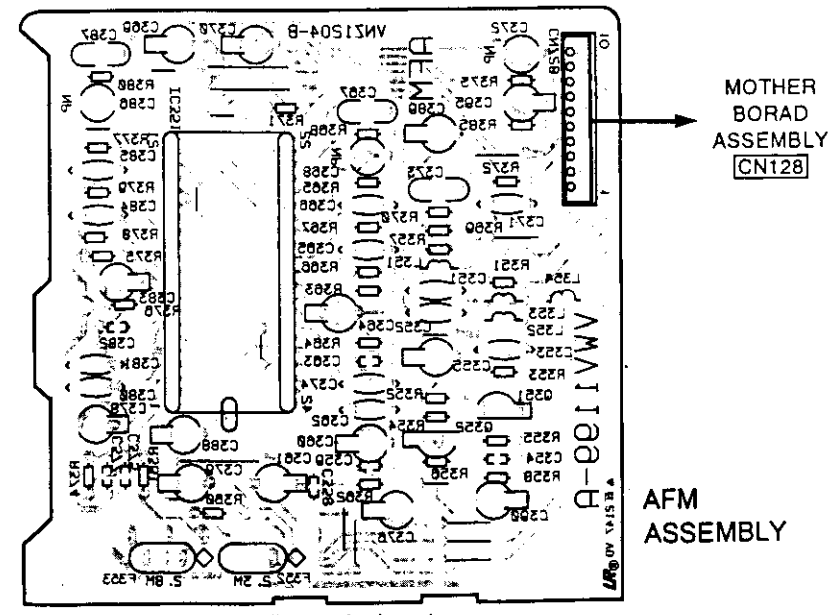
5.9 AFM ASSEMBLY

AFM ASSEMBLY

---:RF Signal Line  
—:AFM Signal Line



This P. C. B. connection diagram is viewed from the parts mounted side.



This P. C. B. connection diagram is viewed from the foil side.

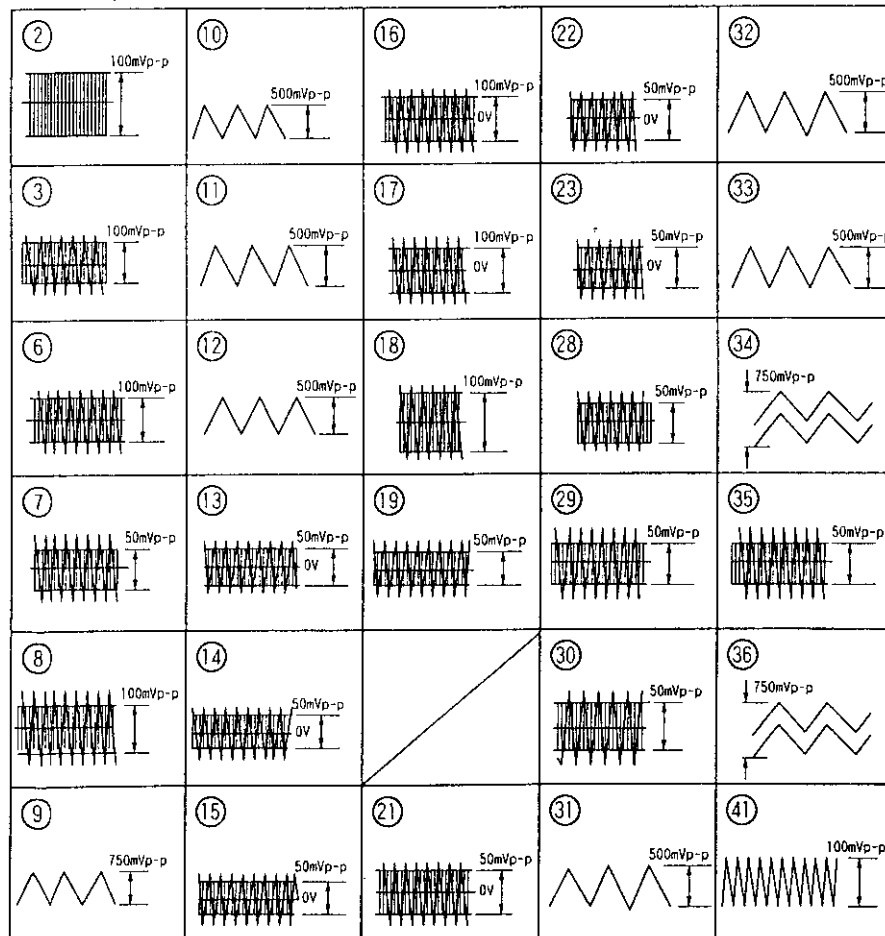
Note: Waveforms and voltages are at the PLAY state.

IC351 (PA0034A)

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	-5V	15	*	29	*
2	*	16	*	30	*
3	*	17	*	31	*
4	---	18	*	32	*
5	---	19	*	33	*
6	*	20	0	34	*
7	*	21	*	35	*
8	*	22	*	36	*
9	*	23	*	37	---
10	*	24	0	38	---
11	*	25	5V	39	---
12	*	26	0	40	---
13	*	27	0	41	*
14	*	28	*	42	-5V

\*: Refer to Waveforms

• IC351 (PA0034A)



Note: Waveforms and voltages are at the PLAY  
IC201 (CXD2500AQ)

Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage	Pin No.	Voltage
1	0	15	0	29	0	43	*	57	*	71	*
2	0	16	4.8	30	0	44	0	58	*	72	5
3	0	17	0	31	*	45	4.8	59	5	73	5
4	*	18	*	32	*	46	*	60	*	74	*
5	0	19	2.4	33	4.8	47	*	61	5	75	0
6	4.8	20	*	34	*	48	*	62	*	76	0
7	0	21	0	35	*	49	*	63	*	77	*
8	4.8	22	2.3	36	*	50	*	64	*	78	*
9	0	23	4.8	37	*	51	*	65	0	79	*
10	0	24	*	38	*	52	0	66	*	80	0
11	0	25	0	39	0	53	*	67	*		
12	0	26	0	40	4.8	54	*	68	0		
13	0	27	*	41	*	55	0	69	*		
14	0	28	0	42	*	56	*	70	5		

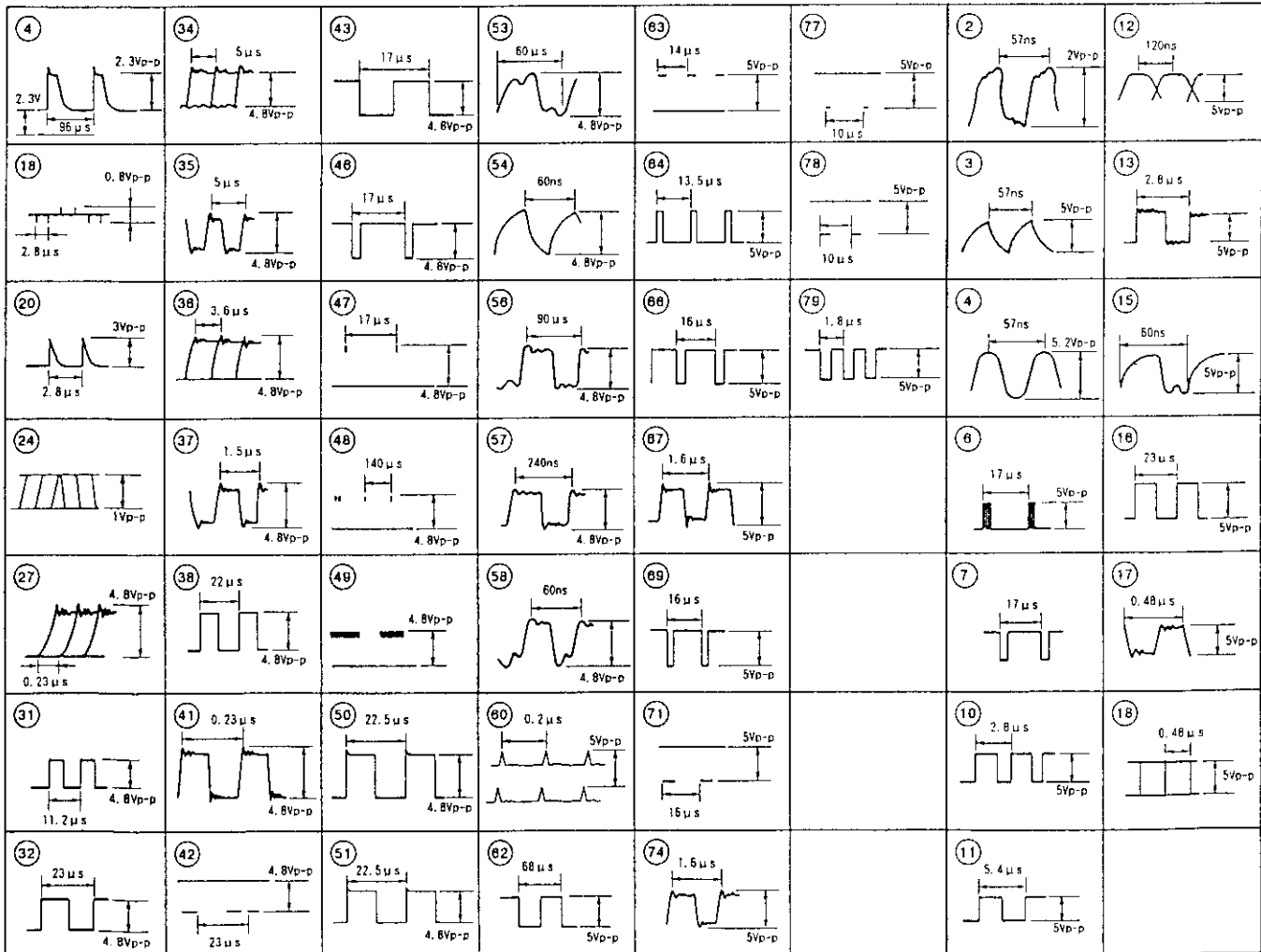
\*: Refer to Waveforms

IC202 (SM5840AP)

Pin No.	Voltage	Pin No.	Voltage
1	5	10	*
2	*	11	*
3	*	12	*
4	*	13	*
5	0	14	5
6	*	15	*
7	*	16	*
8	5	17	*
9	5	18	*

IC201 (CXD2500AQ)

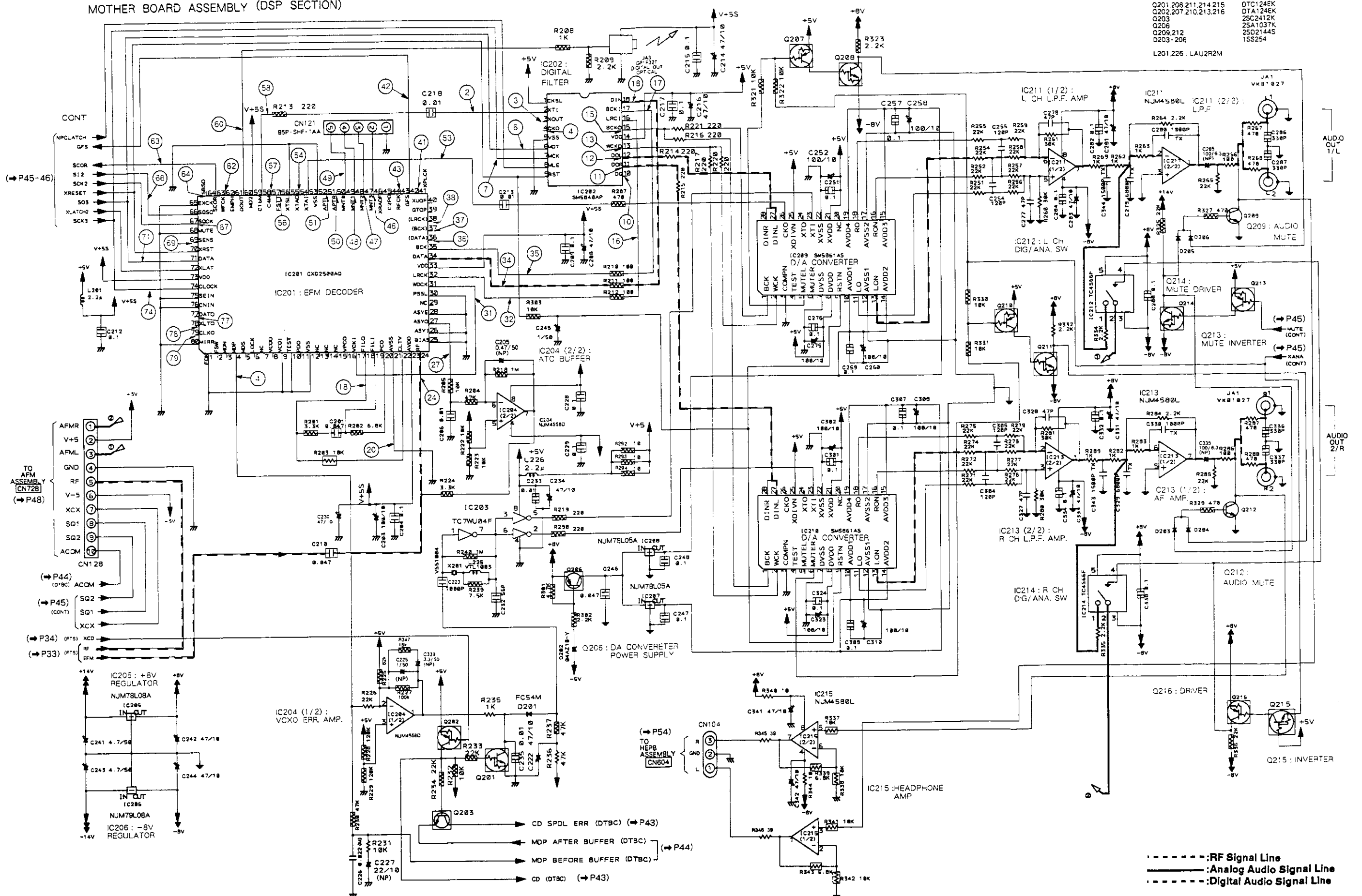
IC202 (SM5840AP)



5.10 MOTHER BOARD ASSEMBLY (DSP SECTION)

MOTHER BOARD ASSEMBLY (DSP SECTION)

- Q201,206,211,214,215 OTC124EK
- Q202,207,210,213,216 DTA124EK
- Q203 25C2412K
- Q206 25A1037K
- Q209,212 25D21445
- D203,206 15S254
- L201,226 LAU2R2M



---:RF Signal Line  
 ---:Analog Audio Signal Line  
 ---:Digital Audio Signal Line

5.11 FLKY, HEPB AND PWSB ASSEMBLIES

A

B

C

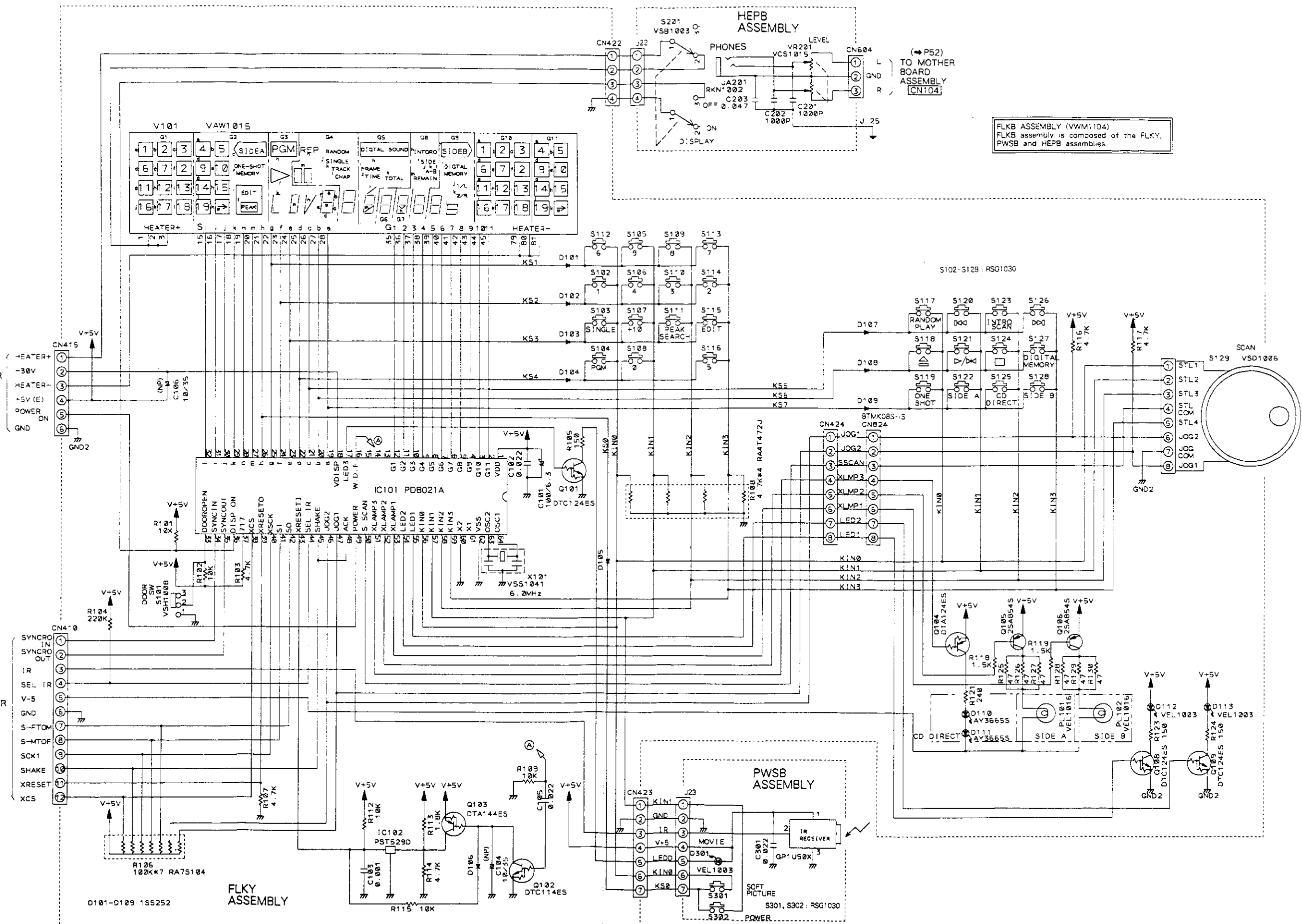
D

A

B

C

D



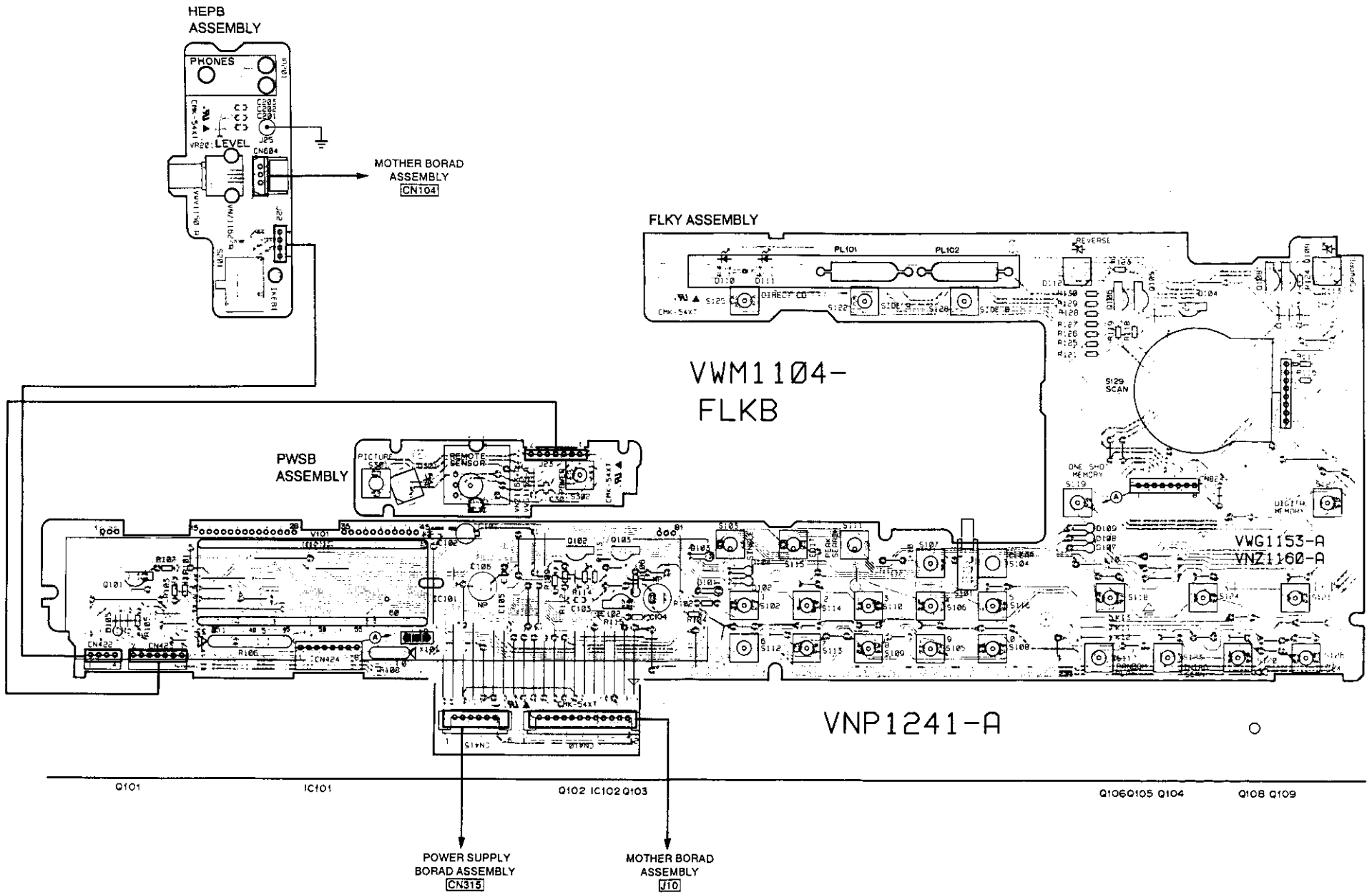
FLKB ASSEMBLY (VWM104)  
 FLKB assembly is composed of the FLKY,  
 PWSB and HEPB assemblies.

(P52)  
 TO MOTHER  
 BOARD  
 ASSEMBLY  
 CN104

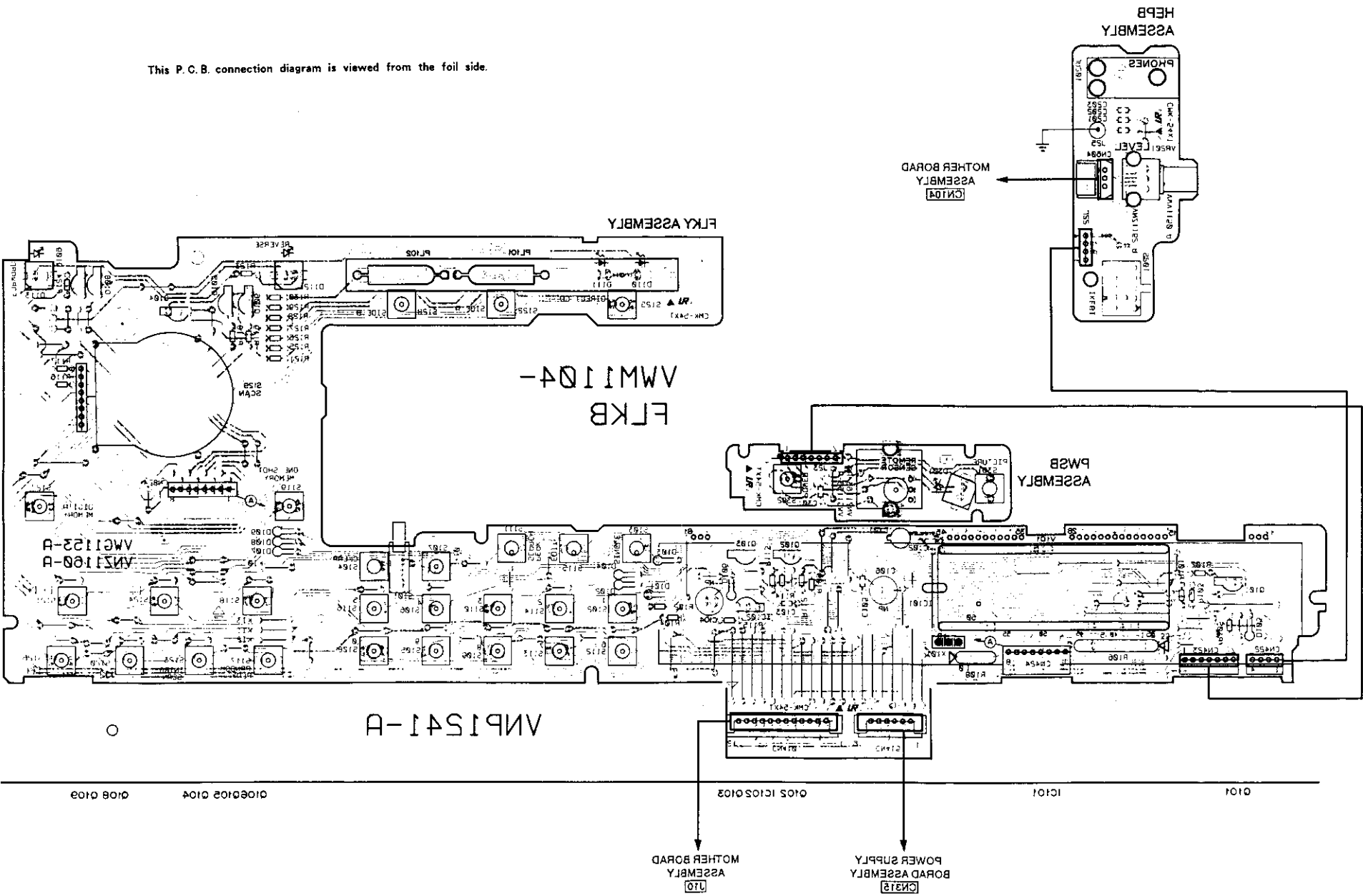
(P24)  
 TO POWER  
 SUPPLY  
 BOARD  
 ASSEMBLY  
 CN315

(P45)  
 TO MOTHER  
 BOARD  
 ASSEMBLY  
 J10





This P.C.B. connection diagram is viewed from the foil side.



## 6. ELECTRICAL PARTS LIST

**NOTES:**

- Parts without part number cannot be supplied.
- Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits(any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560 Ω → 56 × 10<sup>1</sup> → 561 ..... RD114PS 561J

47k Ω → 47 × 10<sup>3</sup> → 473 ..... RD114PS 473J

0.5 Ω → 0R5 ..... RN2H 0R5K

1 Ω → 010 ..... RS1P 010K

Ex.2 When there are 3 effective digits(such as in high precision metal film resistors).

5.62k Ω → 562 × 10<sup>1</sup> → 5621 ..... RN114SR 5621F

### Miscellaneous Parts

Mark	Symbol & Description	Part No.
	Power Supply Board assembly	VWR1098
⊙	MAIN board assembly MOTHER board assembly FG board assembly SWITCH board assembly	VWM1156
⊙	FLKB board assembly FLKY assembly PWSB assembly HEPB assembly	VWM1104
⊙	S/AFM board assembly SYNR assembly AFM assembly CNNB assembly HEAD assembly	VWM 1172
Δ	Strain relief	CM - 22C
Δ	AC power cord	PDG1015
	Push switch (TRAY SW)	DSG1014
	Lever switch (TURN SW)	DSK1003
	Slide switch (LD,CDV INSIDE)	OSH1001
	Slide switch (CD,B INSIDE)	VSK1008
	Spindle motor assembly	VXA1679
	Loading motor assembly	VXX1262
	Carriage motor assembly - S	VXX1537
	Pickup assembly - S	VXX1553

### ⊙ MAIN Board Assembly (VWM1156)

MAIN board assembly is composed of the MOTHER,FG and SWITCH board assemblies.

### MOTHER Board Assembly

### SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC801	CXA1081S
	IC201	CXD2500AQ
	IC102	LA6510L
	IC603	MB40568
	IC805	MB40778
	IC604	MN4700
	IC602	MN4760S
	IC607,IC609	NJM082S
	IC204	NJM4558D
	IC611,IC612,IC802	NJM4558S
	IC211,IC213,IC215	NJM4580L
	IC207,IC208	NJM78L05A
	IC205	NJM78L08A
	IC206	NJM79L08A
	IC606	PA4018
	IC401	PA5013A
	IC601	PDB011
	IC403	PD0070
	IC101	PD0082B1
	IC803	PM3003
	IC202	SM5840AP
	IC209,IC210	SM5861AS
	IC212,IC214,IC608	TC4566F
	IC203	TC7WU04F
	IC610	VTX1001

### Power Supply Board Assembly (VWR1098)

### SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	IC215	ICP - N38
	IC213,IC214	ICP - N50
	IC202	TH5P4
	F211,F212	PT0.5A

Other parts are not supplied.

Q151,Q152,Q202,Q207,Q210,Q213,	DTA124EK
Q215,Q403,Q407,Q408,Q617,Q824,	
Q826,Q828,Q830	
Q612,Q614,Q903	DTA124ES

**Mark Symbol & Description Part No.**

Q101,Q102,Q201,Q208,Q211,Q214,  
Q215,Q619,Q620,Q811,Q823,Q827,  
Q828,Q832  
Q420,Q804,Q608,Q609,Q613,Q629  
Q206,Q417,Q418,Q618,Q631,Q802,  
Q812,Q819

DTC124EK

DTC124ES

2SA1037K

Q605,Q621,Q626,Q628,Q833,Q901  
Q816,Q818  
Q416  
Q419,Q601 - Q603,Q606,Q607,  
Q815,Q616,Q625,Q827,Q630,  
Q636,Q637,Q902

2SA9335

2SB1165

2SB1237X

2SC1740S

Q203,Q401,Q402,Q404,Q405,Q406,  
Q409,Q412,Q415,Q610,Q611,Q622,  
Q624,Q803 - Q805,Q807,Q810,  
Q814,Q825,Q831  
Q815,Q817

2SC2412K

2SD1762

Q822  
Q209,Q212  
Q821  
D201  
D202,D834

2SD1858X

2SD2144S

2SK184

FC54M

04AZ10 - Y

D802,D803  
D833  
D101,D102,D203 - D206,D802 - D804,  
D806 - D812,D801,D804 - D807,  
D830 - D832  
D601

04AZ2.0 - X

04AZ8.2 - Y

1SS254

1S2339

**COILS**

L804  
L406,L407,L415,L420,L421,L423,  
L611  
L422  
L417,L601,L606,L607

LAU100J

LAU120J

LAU121J

LAU150J

L801,L803  
L424,L802  
L101,L201,L226,L401,L402,L610,  
L613,L617 - L621  
L404,L405,L602,L612

LAU151J

LAU181J

LAU2R2M

LAU220J

L608  
L822  
L408  
L603,L605  
L409,L604

LAU270J

LAU3R3J

LAU330J

LAU390J

LAU470J

L410,L416  
L403  
L418  
L225

LAU560J

LAU820J

LRA221J

VTL1003

(4.7 μH)

**CAPACITORS**

**Mark Symbol & Description Part No.**

VC901 Ceramic trimmer (20p)  
VC602 Ceramic trimmer (45p)  
C935 (1F15 S)  
C614  
C684

VCM-008  
VCM1002  
VCH1039  
CCPUCH180J50  
CCPUSL220J50

C507  
C121,C122  
C277,C278,C327,C328  
C612,C613,C622  
C616

CCCCH390J50  
CCPUSL300J50  
CCPUSL470J50  
CCPUSL560J50  
CCSQCH030C50

C411,C815,C617,C617,C899,C939  
C508  
C409,C427,C440,C496  
C477,C647,C810,C811,C822,C933  
C436

CCSQCH050C50  
CCPUCH150J50  
CCSQCH100D50  
CCSQCH101J50  
CCSQCH120J50

C488,C611,C708  
C407,C467,C475,C476  
C683  
C805,C650  
C418,C419

CCSQCH150J50  
CCSQCH151J50  
CCSQCH180J50  
CCSQCH181J50  
CCSQCH200J50

C408,C495,C871  
C437,C812,C815  
C401,C402,C410,C432,C438,C704  
C424,C463,C875  
C405,C406,C412,C420,C453,C468,

CCSQCH221J50  
CCSQCH270J50  
CCSQCH330J50  
CCSQCH390J50  
CCSQCH470J50

C471,C485,C846,C884,C929  
C232  
C484,C804,C809,C813  
C286,C287,C336,C337,C837,C844,  
C852

CCSQCH560J50  
CCSQCH680J50  
CCSQSL331J50

C818  
C819  
C644,C645  
C205,C665,C866  
C225,C637,C807,C838,C845

CCSQSL471J50  
CCSQSL561J50  
CCSQSL681J50  
CEANPR47M50  
CEANP010M50

C842,C863,C864  
C285,C335  
C339  
C850  
C227,C870

CEANP100M16  
CEANP101M6R3  
CEANP3R3M50  
CEANP2R2M50  
CEANP220M10

C619,C664  
C245,C435,C620,C668,C707,  
C808,C814,C818,C840  
C462,C653,C855,C862

CEANP4R7M50  
CEAS010M50  
CEAS100M16

C203,C252,C258,C260,C275,C302,  
C308,C310,C323,C602,C608,  
C634,C642,C655,C658,C663,  
C678 - C682,C685,C687,C889,C692,  
C696,C698,C700,C701,C711

CEAS101M10

C502  
C101,C123,C124,C628,C648,C668  
C835,C836,C841,C930 - C932  
C241,C243

CEAS102M6R3  
CEAS220M25  
CEAS4R7M50

**Mark Symbol & Description Part No.**

C208,C214,C216,C222,C230,C234,  
C242,C244,C281,C283,C331,C333,  
C341,C342,C404,C416,C425,C428,  
C433,C455,C456,C461,C472,C483,  
C490,C492,C503,C639,C641,C658,  
C660,C713,C722,C823,C857,C859,  
C936,C937

CEAS470M10

C484,C607  
C431,C625,C849,C873  
C226,C818,C649,C843  
C827,C867  
C667,C670,C674,C676,C848,C869

CEAS471M6R3  
CFTNA103J50  
CFTNA223J50  
CFTNA333J50  
CFTNA473J50

C459,C460,C666,C708,C847,C868  
C280,C330,C633,C669  
C458,C874  
C883  
C343,C344

CFTNA683J50  
CFTXA102J50  
CFTXA104J50  
CFTXA124J50  
CFTXA152J50

C480,C715,C723  
C279,C329,C825  
C933  
C254,C255,C304,C305,C604  
C466,C632

CFTXA184J50  
CFTXA682J50  
CKPUYB101K50  
CKPUYB121K50  
CKPUYB331K50

C606  
C508,C725  
C102,C671  
C104,C105,C106,C107,C111,C231,  
C609,C810,C521,C839

CKPUYB681K50  
CKPUYF223Z25  
CKPUY103N16  
OKSQYB102K50

C854  
C627

CKSQYB821K50  
CKPUYB102K50

C103,C108,C120,C206,C213,C218,  
C223,C233,C235,C403,C415,C417,  
C421 - C423,C426,C434,C454,C457,  
C465,C470,C473,C474,C481,C482,  
C489,C491,C493,C494,C501,C504,  
C623,C624,C629,C630,C638,C640,  
C646,C651,C654,C657,C659,C661,  
C672,C673,C677,C686,C691,C693,  
C694,C697,C699,C702,C712,C714,  
C716 - C718,C720,C721,C803,C805,  
C824,C858,C858,C860,C861,C865,  
C938

CKSQYF103Z50

C204,C209,C212,C215,C217,C228,  
C229,C247,C248,C251,C257,C259,  
C276,C282,C284,C288,C301,C307,  
C309,C324,C332,C334,C338,C651,  
C881,C882

CKSQYF104Z25

C110,C125,C126,C201,C210,C246,  
C469,C719,C820,C821  
C429  
C705,C853  
C635

CKSQYF473Z50

CQMA272J50  
CQMA332J50  
CQMA472J50

**RESISTORS**

**Mark Symbol & Description Part No.**

VR482 Semi-fixed VRTB6VS222  
VR602,VR603 Semi-fixed (10KΩ) VRTB6VS103  
VR601 Semi-fixed (2.2KΩ) VRTB6VS222  
VR608 Semi-fixed (33KΩ) VRTB6VS333  
VR521,V604 - VR606,VR609  
Semi-fixed (4.7KΩ) VRTB6VS472

VR607 Semi-fixed (47KΩ) VRTB6VS473  
R405,R408,R412,R413,R429,  
R698 - R701 RN1/6PQ□□□□F

R117,R124,R136,R139,R147,R191,  
R193,R214 - R217,R220,R221,R226,  
R231,R235,R236,R251,R252,  
R254 - R269,R271,R272,R274 - R289,  
R332,R334,R335,R340,R344 - R346,  
R408,R457,R458,R466,R471,R473,  
R474,R601,R602,R605 - R619,R620,  
R626,R628,R629,R645 - R653,R656,  
R669 - R671,R675 - R677,R694,R695,  
R697,R698 - R701,R704 - R711,  
R714 - R723,R729 - R731,R734,R737,  
R738,R739,R813,R832,R833,  
R850 - R852,R856,R862 - R864,R872,  
R873,R877,R879,R885,R886,  
R910 - R913,R983,R987,R991,R992,  
R994,R997

Other resistors RS1/10S□□□J

**OTHERS**

**Mark Symbol & Description Part No.**

X201 Crystal resonator (16MHz) VSS1004  
X101 Ceramic resonator VSS1040  
X602 Crystal resonator VSS1043  
X601 Crystal resonator VSS1044  
CN121 5P top connector B5P-SHF - 1AA

CN103 22P top Connector VKN1137  
JA3 Optical digital module  
(DIGITAL OUT OPTICAL) GPIF32T  
JA4 Mini jack (CD DECK SYNCHRO) RKN1014

JA1 6P pin jack VKB1027  
(VIDEO OUT,AUDIO OUT)  
JA2 2P mini jack VKN - 183  
(CONTROL IN,OUT)

**FG Board Assembly**

**SEMICONDUCTOR**

**Mark Symbol & Description Part No.**

Photo interrupter GPlS51

**SWITCH Board Assembly**

**SWITCHES**

Mark	Symbol & Description	Part No.
	S101 - S103 Push switch (LD, CD, CDV)	DSG1015

**FLKB Board Assembly (VWM1104)**

FLKB board assembly is composed of the FLKY, PWSB and HEPB assemblies.

**FLKY Assembly**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	IC101	PDB021A
	IC102	PST529D
	Q104	DTA124ES
	Q103	DTA144ES
	Q102	DTC114ES
	Q101, Q108, Q109	DTC124ES
	Q105, Q108	2SA854S
	D110, D111	AY3685S
	D112, D113	VEL1003
	D101 - D109	1SS252

**SWITCHES**

Mark	Symbol & Description	Part No.
	S102 - S128 Tact switch DIRECT SEARCH(0,1-9,+10), SINGLE.PGM,PEAK SEARCH, EDIT,RANDOM PLAY, OPEN/CLOSE(▲),ONE SHOT MEMORY,SKIP(◀▶), PLAY/STILL(▶▶▶), DISK SIDE(A,B),INTRO SCAN, STOP(■),DIRECT CD, DIGITAL MEMORY	RSG1030
	S129 Rotary encoder (JOG & SHUTTLE)	VSD1006
	S101 Detector switch (DOOR SW)	VSH1008

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C104, C106	CEALNP100M35
	C101	CEAL101M6R3
	C103	CKPUYB102K50
	C102, C105	CKPUYF223Z25

**RESISTORS**

Mark	Symbol & Description	Part No.
	R108 Resistor array	RAA4T472J
	R106 Resistor array	RA7S104J
	Other resistors	RD1/6PM□□□J

**OTHERS**

Mark	Symbol & Description	Part No.
	X101 Ceramic resonator (6MHz)	VSS1041
	V101 Fluorescent indicator tube	VAW1015
	PL101, PL102 Lamp	VEL1016
	CN824 connector	BTMK08S - 1S
	FL spacer	VEB1140

**PWSB Assembly**

**SEMICONDUCTOR**

Mark	Symbol & Description	Part No.
	D301	VEL1003

**SWITCHES**

Mark	Symbol & Description	Part No.
	S301, S302 Tack switch (SOFT PICTURE, POWER)	RSG1030

**CAPACITOR**

Mark	Symbol & Description	Part No.
	C301	CKPUYF223Z25

**OTHERS**

Mark	Symbol & Description	Part No.
	Remote control sensor unit	GP1U50X

**HEPB Assembly**

**SWITCH**

Mark	Symbol & Description	Part No.
	S201 Rotary switch (FL DISPLAY)	VSB1003

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C203	CGCYF473Z25
	C201, C202	CKPUYB102K50

**RESISTOR**

Mark	Symbol & Description	Part No.
	VR201 Double rotary volume (LEVEL)	VCS1015

**OTHERS**

Mark	Symbol & Description	Part No.
	JA201 Headphone jack (PHONES)	RKN1002

**S/AFM Board Assembly (VWM1172)**

S/AFM board assembly is composed of the SYN R and AFM assemblies.

**SYNR Assembly**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	IC3	CXA1413L
	IC1, IC2	CXL5504P
	IC4	TA7302P
	Q31	XDC124ES
	Q2 - Q5, Q8, Q14, Q16, Q24, Q26, Q28, Q30, Q32, Q34	2SA933S
	Q1, Q6, Q7, Q9 - Q13, Q15, Q17 - Q23, Q25, Q27, Q29, Q33	2SC1740S

**COILS**

Mark	Symbol & Description	Part No.
	L4, L6, L9, L10, L13 - L16	LAU100J
	L18, L19	LAU150J
	L7, L20, L22	LAU180J
	L2, L3, L25	LAU220J
	L11, L12, L17	LAU4R7K
	L24	LAU470J
	L1, L8, L21, L23	LAU680J

**CAPACITORS**

Mark	Symbol & Description	Part No.
	VC1 Ceramic trimmer (45p)	VCM1002
	C23, C57, C62	CCCC050C50
	C24, C58, C61	CCCC070D50
	C4, C20, C54, C63	CCCC100D50
	C25, C28, C30, C31, C33, C35, C37, C52	CCCC121J50
	C71	CCCC150J50
	C2, C47, C49	CCCC151J50
	C29, C32, C36	CCCC181J50
	C21, C55, C64	CCCC330J50
	C48	CCCC390J50

Mark	Symbol & Description	Part No.
	C22, C56, C65	CCCC560J50
	C50, C51	CCCC680J50
	C5	CCCC820J50
	C67	CCCSL331J50
	C11, C26, C43, C59	CEAS010M50
	C10, C17, C18, C60, C66, C73, C75 - C77, C79, C84, C91	CEAS101M10
	C8, C16, C82	CEAS102M6R3
	C12, C19, C46, C53, C74	CEAS220M25
	C80	CEAS471M6R3
	C83	COMA104J50
	C1, C3, C6, C7, C8, C13 - C15, C27, C34, C38 - C42, C44, C45, C68 - C70, C72, C78	CKPUYY103N16
	C85, C86	CCDCH100D50
		CGDYX473M25

**RESISTORS**

Mark	Symbol & Description	Part No.
	VR3 Semi-fixed (1K Ω)	VRTB6VS102
	VR1, VR2, VR4 Semi-fixed (4.7K Ω)	VRTB6VS472
	Other resistors	RD1/6PM□□□J

**OTHERS**

Mark	Symbol & Description	Part No.
	X1 Crystal resonator	VSS1048
	4P mini DIN socket (S VIDEO OUT)	VKN1072

**AFM Assembly**

**SEMICONDUCTORS**

Mark	Symbol & Description	Part No.
	IC351	PA0034A
	Q351, Q352	2SC1740S

**COILS AND FILTERS**

Mark	Symbol & Description	Part No.
	L353	LAU270J
	L354	LAU470J
	L351, L352	LAU560J
	F352 SIF (2.30MHz)	VTF1048
	F353 SIF (2.80MHz)	VTF1049

**CAPACITORS**

Mark	Symbol & Description	Part No.
	C352	CCCC221J50
	C374, C381	CCCC560J50
	C351, C353	CCCC810J50
	C362, C380	CCCSL271J50
	C372	CEANP010M50

Mark	Symbol & Description	Part No.
C368, C386		CEANP220M10
C388		CEASR47M50
C355, C370		CEAS100M50
C360, C361, C369, C376, C378, C379, C389		CEAS101M10
C384, C383, C395		CEAS220M25
C390		CEAS471M10
C365, C366, C384, C385		CKCYB472K50
C371		CKCYF473Z50
C363, C382		CKPUYX682M18
C354, C358, C359, C375, C377		CKPUYY103N18
C373		CQMA104J50
C367, C387		CQMA393J50

**RESISTORS**

Mark	Symbol & Description	Part No.
All resistors		RD1/8PM □□□J

**CNNB Assembly**

**SWITCH**

Mark	Symbol & Description	Part No.
S201	Lever switch	VSK1017

**RESISTORS**

Mark	Symbol & Description	Part No.
R102		RD1/8PM221J
R101		RD1/8PM272J

**OTHERS**

Mark	Symbol & Description	Part No.
CN203	22P Side connector	VKN1138
CN204	25P Side connector	VKN1139

**HEAD Assembly**

**SEMICONDUCTOR**

Mark	Symbol & Description	Part No.
Q1		2SC4081

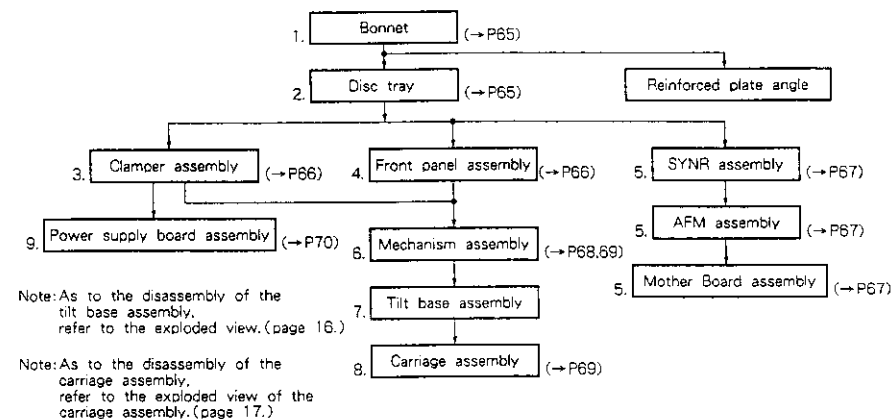
**CAPACITORS**

Mark	Symbol & Description	Part No.
C3		CKSQYF104Z25
C5		CKSYF105Z16

**RESISTOR**

Mark	Symbol & Description	Part No.
VR1	(10kΩ)	VCP1025

**7. DISASSEMBLY**



**1. Bonnet**

- ① Remove four screws **A** from the both sides of bonnet and remove three screws **B** from the rear of the bonnet.

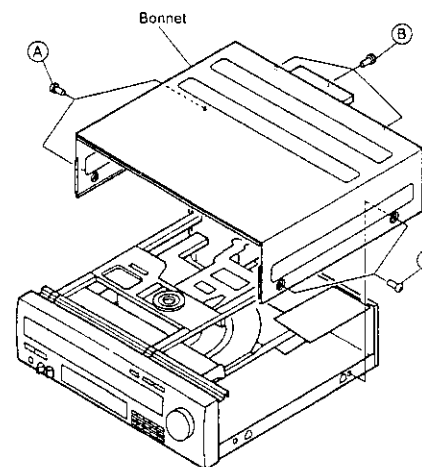


Fig. 7-1

**2. Disc Tray**

- ① Turn the power switch on and press the EJECT button then pull the tray out from the player.
- ② Remove two tray stopper screws **A**.
- ③ Pull out the tray toward the front.

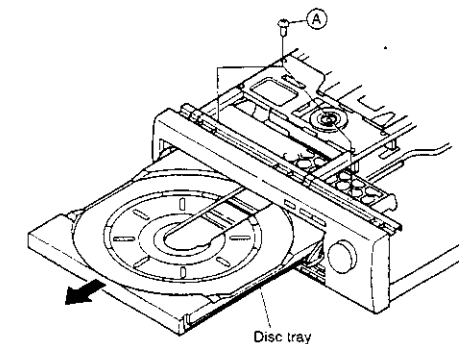


Fig. 7-2

### 3. Clamper Assembly

- ① Remove four screws (A) to remove the clamper assembly.
- ② Remove a screw (B) to remove the clamper.

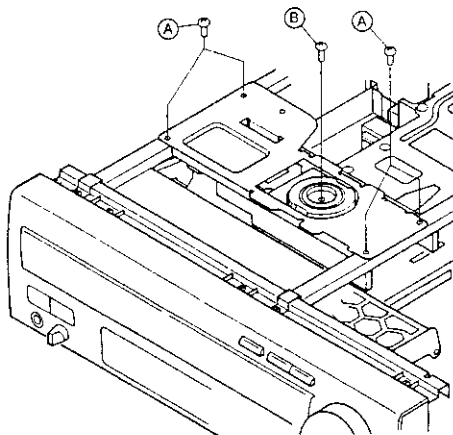


Fig. 7-3

- ③ Remove two screws (C).
- ④ Remove two springs (D). (Be careful of the one side of spring is fixed with bond adhesive.)

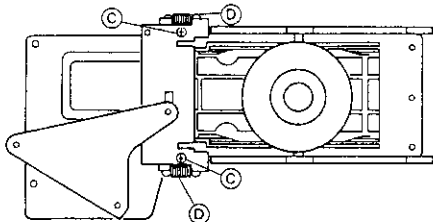


Fig. 7-4 Rear side of the clamper assembly

- ⑤ Set the roller pin to lowermost point of the clamp cam for clamper. Then remove the clamp cam by sliding it.

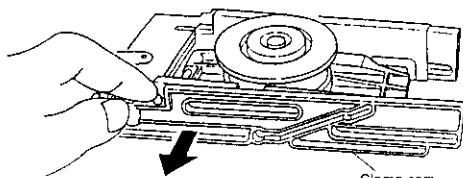


Fig. 7-5

### 4. Front Panel

- ① Remove three screws (A) by opening the front door (tray is out).

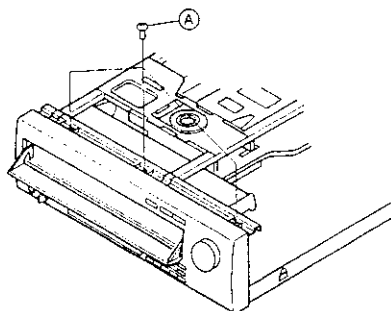
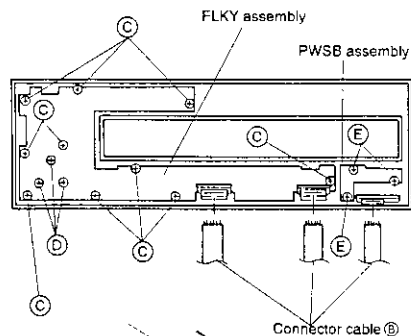
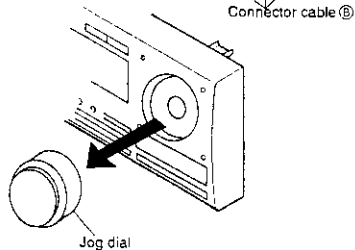


Fig. 7-6

- ② Disconnect three connector cables (B).
- ③ Remove ten screws (C) to remove the FLKY assembly and three screws (D) to remove the jog dial.
- ④ Pull out the jog dial.
- ⑤ Remove three screws (E) to remove the PWSB assembly.



Connector cable (B)



Jog dial

Fig. 7-7

### 5. SYN, AFM and MOTHER Board Assembly

#### -SYNR assembly-

- ① Remove two screws (A) from the rear panel.
- ② Remove two PCB holders.

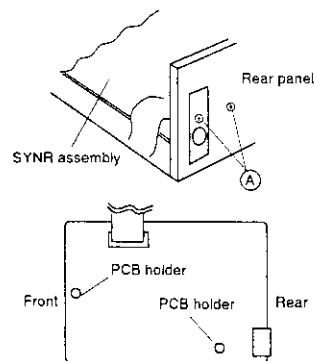


Fig. 7-8

#### -AFM assembly-

- ① Remove a PCB holder.
- ② Disconnect the connector from the MOTHER board assembly.

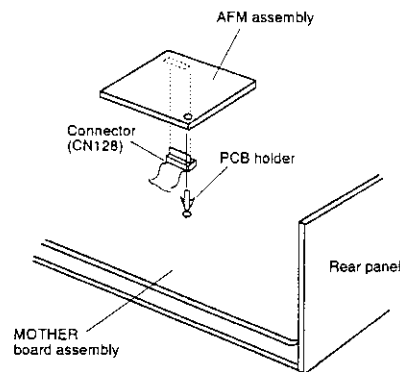


Fig. 7-9

#### -MOTHER Board assembly-

- ① Disconnect the flexible cable. (Be careful of the static electricity.)
- ② Remove three screws (A) from the MOTHER board assembly.
- ③ Remove four screws (B) from the rear panel.
- ④ Disconnect all connectors from the MOTHER board assembly.

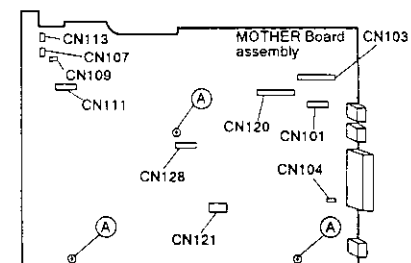


Fig. 7-10

#### -Diagnosis of the MOTHER board assembly-

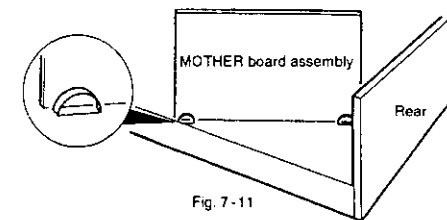


Fig. 7-11

### 6. Mechanism Assembly and Tilt Base (Upper) Assembly

- ① Remove three screws (A) from the left side of the slide cam.
- ② Remove two screws (B) from the side stay (L).

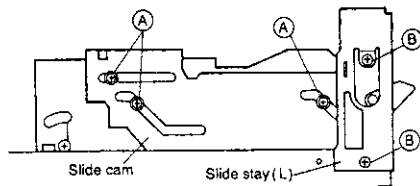


Fig. 7-12

- ③ Remove seven screws (C) from the mechanism chassis to remove the mechanism assembly.
- ④ Remove four screws (D) to remove the tilt base (upper) assembly.

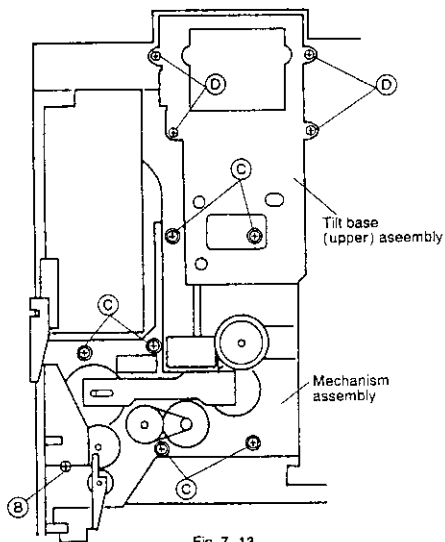


Fig. 7-13

### -Positioning the gears and the grease apply points-

1. Apply a grease to the spring bus cam.

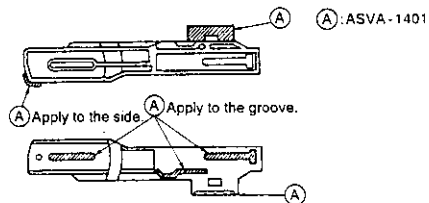


Fig. 7-14

2. Apply a grease to the cam gear.

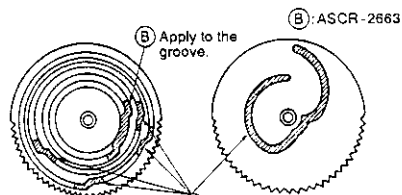


Fig. 7-15

3. Positioning the roller plate assembly (slide gear).

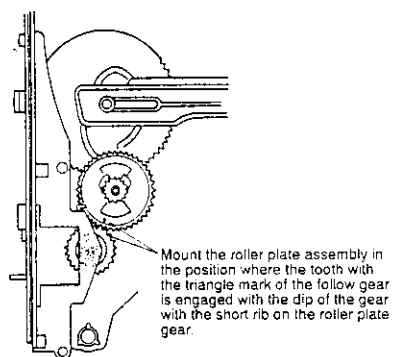


Fig. 7-16

4. Positioning the cam gear.

- ① Move two cams in the direction of arrow.
- ② Move this cam in the direction of arrow.
- ③ Insert the cam gear so that the end of the cam gear comes to the position nearest to the shaft.
- ④ Confirm that two cams are moved when turning the came gear to the shaft in the direction of arrow.
- ⑤ Confirm that the cam is turned when pressing the direct SW.

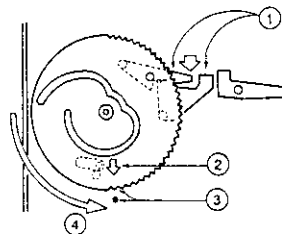


Fig. 7-17

5. Apply a grease to the follow gear.

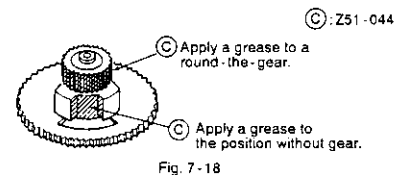


Fig. 7-18

6. Caution of installing the stop ring

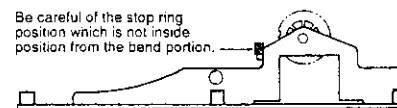


Fig. 7-19

### 8. Carriage Assembly

- ① Slide the carriage assembly to the shaft of the turn plate by hand.

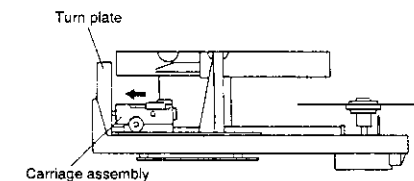


Fig. 7-20

- ② Disconnect two connectors (B) and (C) from the CNNB assembly to remove the flexible cable.
- ③ Remove six screws (A) from the post (L) and (R) to remove the tilt base.
- ④ Pull out the carriage assembly by setting the tilt base (upper) toward the upper.

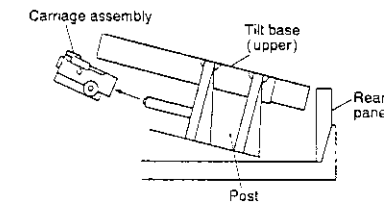
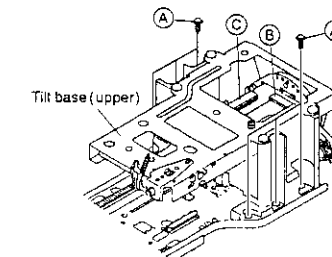


Fig. 7-21



### 9. Power Supply Board Assembly

① Insert a screwdriver into the chassis hole near a strain relief through the back of the base chassis and remove the strain relief stop ring.

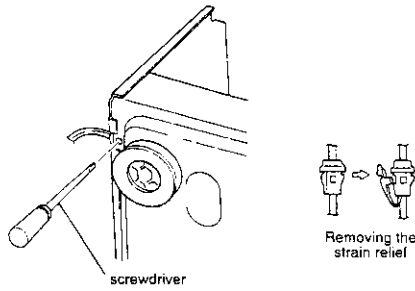


Fig. 7-22

② Remove four screws (A) and raise the power supply board assembly. Then the power supply board assembly can be diagnosed for component replacement through the foil side.

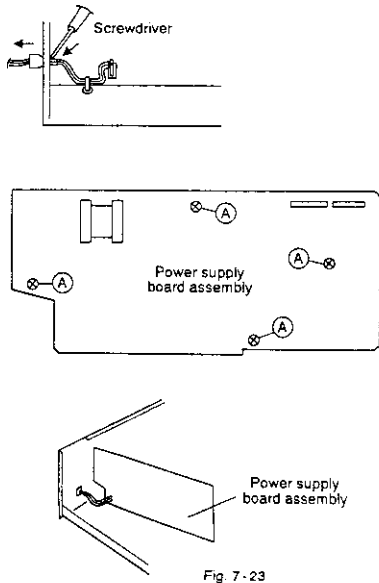


Fig. 7-23

## 8. ADJUSTMENT

### 8.1 MOTHER BOARD AND SYN R ASSEMBLIES ADJUSTMENT ABSTRACT

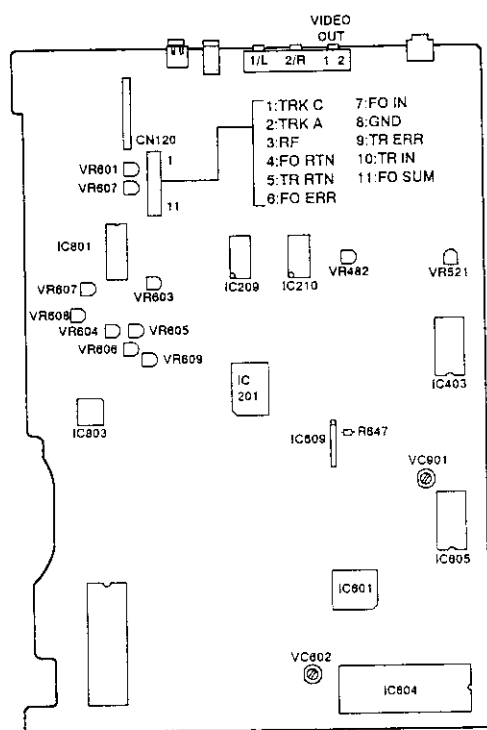
#### 8.1.1 Mother Board Assembly

ADJUSTMENT	P	Adjusting Point	Measurement equipment Connecting Point	Player Condition	Adjusting Specification	
1		Coarse Grating and Tracking Balance Adjustment	79	Grating / VR602	CN120-9 (TRKG ERR)	<ul style="list-style-type: none"> <li>• Test mode #8,500 still TRKG servo open</li> <li>• Null point → TRK error MAX</li> <li>• Adjust VR602 so that the TRK error waveform amplitude's positive and negative level become equal.</li> </ul>
2		FOCS RTN Calibration Adjustment	80	Player SKIP key	CN120-4 (FOCS RTN)	<ul style="list-style-type: none"> <li>• #9,800 still #25,800 still TRKG servo open</li> <li>• Adjust that the FOCS RTN voltage becomes 0 ± 20mV.</li> </ul>
3		Pickup Tangential Direction Angle Adjustment and Tilt Servo Balance Adjustment	81	VR608 (TILT GAIN) VR607 (TILT BAL)	CN120-3 (RF)	<ul style="list-style-type: none"> <li>• Test mode #2,701 (black screen) still TRKG servo open/close</li> <li>• Adjust TILT BALANCE (VR607)</li> <li>• RF waveform's amplitude MAX / VR608, TILT GAIN, and Pickup tangential direction angle adjustment screw)</li> </ul>
4		TRKG Error Best / Crosstalk Best Adjustment	82	VR605 (TE BEST) VR606 (CT BEST)	CN120-3 (RF) CN120-9 (TRKG ERR)	<ul style="list-style-type: none"> <li>• Test mode TRKG servo close / open Tilt servo OFF</li> <li>• TRK error MAX (VR605) RF MAX (VR606)</li> </ul>
5		FOCS SUM Level Adjustment	83	VR609	CN120-11 (FOCS SUM)	<ul style="list-style-type: none"> <li>• Play mode</li> <li>• Adjust VR609 so that the voltage becomes 2V DC.</li> </ul>
6		Spindle Motor Centering Check	84	Check the lissajous figure.	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRKG A+C)	<ul style="list-style-type: none"> <li>• Test mode #100 and #22,000 TRKG servo open</li> <li>• Check that the amplitude of the lissajous figure of the frame #100 is the same as that of the frame #22,000.</li> </ul>
7		Spindle Motor Centering Adjustment	85	Spindle motor centering adjustment screw.	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRKG A+C)	<ul style="list-style-type: none"> <li>• Test mode #100 and #22,000 TRKG servo open / close</li> <li>• Adjust the centering adjustment screw so that the lissajous figures of #100 and #22,000 are the same.</li> </ul>
8		Fine Grating Adjustment	86	Grating	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRK A+C)	<ul style="list-style-type: none"> <li>• Test mode #6,500 still TRKG servo open</li> <li>• Minimize the Y direction of the lissajous figure.</li> <li>• Level of the X direction of the lissajous figure are equal.</li> </ul>
9		RF Gain Adjustment	87	VR601	CH1:CN120-3 (RF)	<ul style="list-style-type: none"> <li>• Test mode #15,000 still TRKG servo close</li> <li>• Adjust VR601 so that the RF level becomes 300mV ± 50mV.</li> </ul>
10		FOCS Servo Loop Gain Adjustment	88	VR604	CH1:CN120-8 (FOCS ERR) CH2:CN120-7 (FOCS IN)	<ul style="list-style-type: none"> <li>• Test mode #15,000 still TRKG servo close</li> <li>• Adjust VR604 so that the lissajous figure is symmetrical with respect to the X and Y axes.</li> </ul>
11		TRKG Servo Loop Gain Adjustment	89	VR603	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRKG A+C)	<ul style="list-style-type: none"> <li>• Test mode #15,000 still TRKG servo close</li> <li>• Adjust VR603 so that the lissajous figure is symmetrical with respect to the X and Y axes.</li> </ul>
12		Position Check at the Start Play and Centering Adjustment for Side B Play	90	Centering adjustment hole for side B.	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRKG A+C)	<ul style="list-style-type: none"> <li>• Test mode #100 play TRKG servo open / close</li> <li>• Adjust that the X-axis amplitude of the lissajous figure becomes maximum.</li> </ul>
13		Pickup Tangential Direction Angle Adjustment for Side B Play	91	Pickup tangential direction angle adjustment screw.	TV monitor	<ul style="list-style-type: none"> <li>• Test mode #115 still</li> <li>• Adjust that the crosstalk is minimized.</li> </ul>
14		Fine Centering Adjustment for Side B Play	92	Centering adjustment hole for side B	CH1:CN120-9 (TRKG ERR) CH2:CN120-1, 2 (TRKG A+C)	<ul style="list-style-type: none"> <li>• Test mode #100 play TRKG servo open</li> <li>• Adjust that the X-axis amplitude of the lissajous figure becomes maximum.</li> </ul>
15		Reference Frequency Adjustment	93	VC601 VC602	R647 lead wire IC605 10pin	<ul style="list-style-type: none"> <li>• Stop mode (blueback screen)</li> <li>• Play mode</li> <li>• Adjust VC601 so that the frequency becomes 3,579545 MHz.</li> <li>• Adjust VC602 18 MHz</li> </ul>
16		Output Video Level Adjustment	94	VR482	VIDEO OUT terminal	<ul style="list-style-type: none"> <li>• #19,900 still</li> <li>• Adjust VR482 so that the voltage between the sync lip and the white peak becomes 0.71V ± 5%.</li> </ul>
17		Color Tint Error Signal Level Adjustment	95	VR521	TV monitor	<ul style="list-style-type: none"> <li>• #8,000 still</li> <li>• Color irregularity on the magenta screen is minimized.</li> </ul>

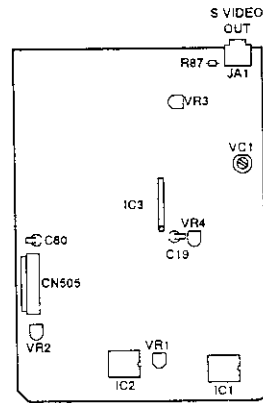
8.1.2 SYNRR Assembly

	ADJUSTMENT	P	Adjusting Point	Measurement equipment Connecting Point	Player Condition	Adjusting Specification
18	Chroma Level Adjustment(1)	96	VR1 VR2	IC3 pin 1,3, and 5	● # 8,000 still	● Chroma level minimum
19	Chroma Level Adjustment(2)	97	VR3 VC1	R87 lead wire	● # 8,000 still	● Chroma level minimum
20	S Video Level Adjustment	98	VR4	CH1 : C19 lead wire CH2 : C80 lead wire	● # 3,801 (white screen)	● The S video level of CH1 becomes the same as that of CH2.

8.2 ADJUSTMENT POINTS OF THE MOTHER BOARD AND SYNRR ASSEMBLIES



MOTHER BOARD ASSEMBLY

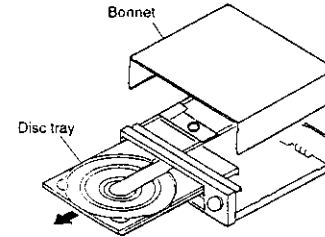


SYNRR ASSEMBLY

8.3 TEST MODE

8.3.1 TEST MODE

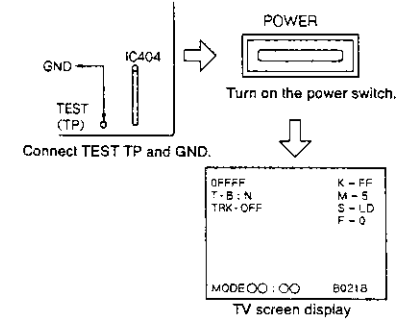
The player has a test mode function which allows the servicier to check the player's status on the TV screen by executing the respective key operation. Also, since the TRK servo opens and closes easily, the test mode is especially useful for mechanical adjustments.



8.3.2 TEST MODE INITIATION

[Procedure]

1. Remove the bonnet and disc tray.
2. Connect the TEST (TP) in the Mother board assembly to GND.
3. Turn on the power switch.



8.3.3 TEST MODE CANCELLATION

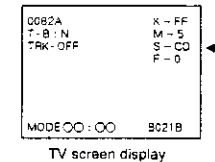
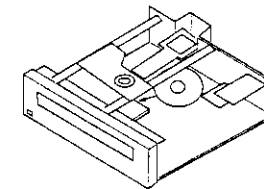
Turn off the power switch.

8.3.4 PLAYER OPERATION IN THE TEST MODE

Operate the player by selecting a test mode function with the keys on the player or on the remote control unit.

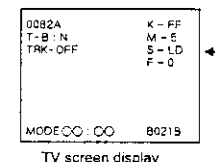
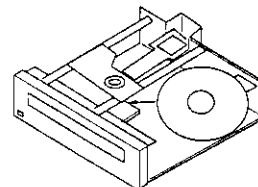
● CD PLAYBACK

- ① Place the CD disc on the turn table. (Clamper is already lifted up.)
- ② Press the [◀] or [▶] keys to appear "S-CD" on the TV screen display.
- ③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.



● LD PLAYBACK

- ① Place the LD disc on the turn table. (Clamper is already lifted up.)
- ② Press the [◀] or [▶] keys to appear "S-LD" on the TV screen display.
- ③ Clamp the disc by pressing the PLAY (▶) key once. Then, press the PLAY (▶) key twice, disc will be normal playbacked.





③ TRK Servo Status

TV screen display

TRK-○○○

ON...TRK servo close  
OFF...TRK servo open

④ Remote Control / Player Key Reception Data

TV screen display

K-○○○

See table below

Code	Function	Code	Function	Code	Function	Code	Function
00	0	20	F JOG0	40	(CHAP / TRK)	60	
01	1	21	F JOG1	41	(FRAM / TIM)	61	
02	2	22	F JOG2	42	(SEARCH)	62	
03	3	23	F JOG3	43	DISPLAY	63	
04	4	24	R JOG0	44	REPEAT B	64	
05	5	25	R JOG1	45	CLEAR	65	
06	6	26	R JOG2	46	SPEED -	66	
07	7	27	R JOG3	47	SPEED +	67	
08	8	28		48	REPEAT A	68	
09	9	29		49	(2 / R)	69	
0A	VOLUME +	2A		4A	(STEREO)	6A	
0B	VOLUME -	2B		4B	(1 / L)	6B	
0C	DGT / ANL	2C		4C	PROGRAM	6C	
0D		2D		4D		6D	PLAY / PAUSE
0E	CX ON/OFF	2E		4E		6E	STOP
0F	(TV / LDP)	2F		4F		6F	OPEN / CLOSE
10	(F - SCAN)	30		50	F - STEP	70	
11	(R - SCAN)	31		51		71	DIRECT CD
12		32		52	F - SKIP	72	PEAK
13	CHAP / FRME	33		53	R - SKIP	73	SINGLE
14		34		54	R - STEP	74	
15		35		55	R - MULT	75	
16	STOP / OPEN	36		56		76	
17	PLAY/SEARCH	37	DGT LEVEL	57		77	
18	PAUSE	38		58	F - MULT	78	
19		39		59		79	
1A	(POW ON)	3A		5A	HILIT / INTR	7A	
1B	(POW OFF)	3B		5B		7B	
1C	POW ON/OFF	3C		5C		7C	
1D	EDIT	3D		5D		7D	
1E	AUDIO	3E		5E	RNDM (TEST)	7E	
1F	+10	3F		5F	(ESC)	7F	

⑤ SLD Position

TV screen display

S-○○○

IN ... CD inside SW ON  
CD ... CD active area  
CDV ... CDV active area  
LD ... LD active area  
B IN ... LD B inside SW ON

⑥ Mechanical Loading Position

TV screen display

M-○○○

0 ... Tray open  
1 ... Loading  
2 ... Standby  
3 ... Clamped  
5 ... Tilt minus  
7 ... Tilt plus  
8 ... Tilt limit  
9 ... B side clamped (two sides)

⑦ Focus offset VR Status

TV screen display

F-○○○

0 ... Normal state  
TRKG close : VR606(CT MAX)  
TRKG open : VR605(TE MAX)  
1 ... VR606 is effected when opening the TRKG.

⑧ As to the mode indication, refer to the CLD - 3090 service guide.

8.4 ADJUSTMENT

8.4.1 JIGS AND INSTRUMENTS REQUIRED FOR ADJUSTMENT

- Small screwdriver (about 10cm long)
- Small Phillips screwdriver
- Hexagonal wrenches (2.0mm and 2.5mm)
- Dual-trace oscilloscope (with delay)
- AF oscillator
- Frequency counter
- LD test disc (GGV1003)
- LDD disc (buy locally)
- CD test disc (YEDS-7)
- Shorting clip
- L-shaped eccentric screwdriver (GGV-129)
- Phillips head screwdriver
- Resistor (47kΩ, 10kΩ × 2)
- Low-pass filter (47kΩ + 1μF)

8.4.2 PREPARATIONS FOR ADJUSTMENT AND PRECAUTIONS

1) When replacing the pickup assembly, adjust in the following way:

- Carriage assembly in forward state -

1. Coarse grating adjustment, tracking balance adjustment
2. FOCS RTN calibration adjustment
3. Crosstalk adjustment
  - 1) Adjustment of inclination of the pickup in the tangential direction and tilt servo balance adjustment
  - 2) TRKG error best / crosstalk best adjustment
4. FOCS SUM level adjustment
5. 1) Spindle motor centering check  
2) Spindle motor centering adjustment
6. Fine grating adjustment
7. RF gain adjustment
8. FOCS servo loop gain adjustment
9. TRKG servo loop gain adjustment

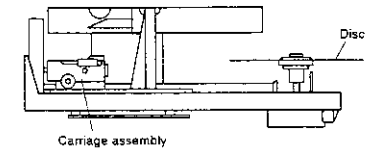
- Carriage assembly in reverse state -

10. Centering adjustment for side B play
11. Pickup tangential direction angle adjustment for side B play
12. Fine centering adjustment for side B play

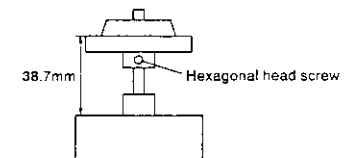
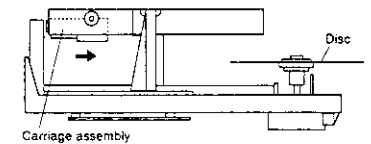
Note: The forward status of carriage assembly is when the carriage assembly is in the position to play side A of the disc. The reverse status is when it is in the position to play side B of the disc.

2) Adjust the height of the turntable when the spindle motor is replaced.

Carriage assembly forward state



Carriage assembly reverse state



Loosen the hexagonal head screw and measure the height with a caliper. Then retighten the screw.

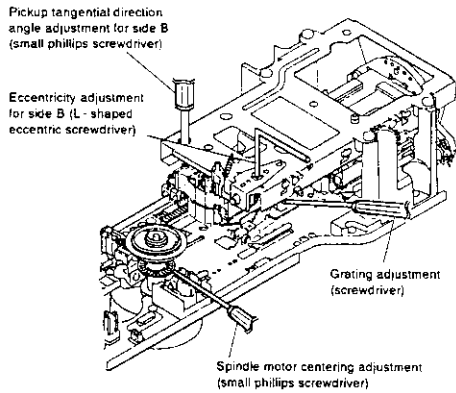
Turntable height adjustment

**3) Side B play**

Direct side B play is possible by pressing the SIDE B key of the front panel.

**4) Where to insert the screwdriver when adjusting the pickup assembly**

- Carriage assembly in forward state -



**5) Test disc**

The LD test disc used for mechanical adjustment and MOTHER board assembly adjustment may either be the GGV1003. The frame numbers given in the text are for the GGV1003.

The LD test disc used for electrical adjustments can be either N series.

6) Numbers given in connection diagram correspond to those in the text covering the adjustment procedure.

7) Frame numbers are not displayed on the monitor TV, please read the FL display.

8) Perform all adjustment by setting the tilt serve to ON.

**8.4.3 MECHANICAL ADJUSTMENT**

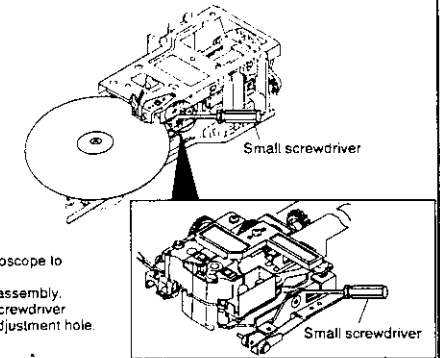
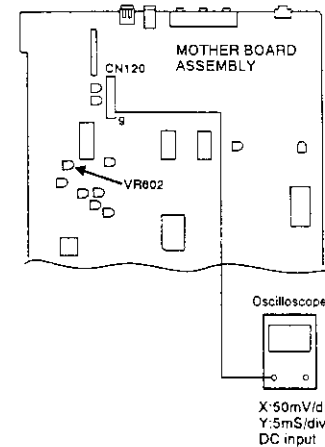
**1. COARSE GRATING AND TRACKING (TRKG) BALANCE ADJUSTMENT**

**Mechanical Adjustment**

- Purpose: To adjust the laser beam which is divided into three by the grating to the optimum position on the track. Set the TRKG servo offset voltage to 0 V.
- When not properly adjusted: Disc playback will be impossible. During play, tracks may be skipped.

- |                                   |   |
|-----------------------------------|---|
| ● Measuring instruments and jigs: | ● Small screwdriver ● Oscilloscope                      |
| ● Measuring point:                | ● CN120-9 (TRKG ERR)                                    |
| ● Test disc and player mode       | ● 8-inch LD test disc GGV1003...#6,500 ● Still mode     |
|                                   | ● Test Mode (TRKG servo:Open)                           |
|                                   | ● The carriage assembly should be in the forward state. |
| ● Positions to be adjusted        | ● Grating ● VR602 (TRKG balance)                        |

**Connection diagram**



4. Connect an oscilloscope to CN120-9 in the MOTHER board assembly.
5. Insert the small screwdriver into the grating adjustment hole.

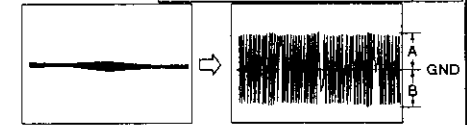


Fig. 1 On-track position

Fig. 2 Maximum amplitude A=B

**Adjustment Procedure**

**<Coarse Grating Adjustment>**

1. Play the LD test disc.
2. Search around for frame #6,500.
3. Open the TRKG servo (See page 70.)
4. Connect an oscilloscope to CN120-9 and observe the waveform.
5. Insert the small screwdriver into the grating adjustment hole. Turning the grating will allow you to vary the amplitude of the TRKG error waveform. Find the position where the waveform amplitude becomes minimum with a smooth envelope. (Fig. 1) (This indicates that the 3-way split laser beams are directed onto the track. This is called the "on-track" position.)
6. Slowly turn the grating counterclockwise from the on track position until the waveform amplitude becomes maximum. (Fig. 2)

7. Close the TRKG servo and check that a normal picture is displayed on the TV screen.

**<TRKG Balance Adjustments>**

1. Align the oscilloscope GND so that it comes to the center of the oscilloscope screen.
2. Adjust VR602 so that the positive and negative amplitude of the TRKG error waveform become equal. (Fig. 2)

*Note: If adjustment of VR602 fails to disturb the tracking, perform the adjustment after set VR607 to the mechanical center.*

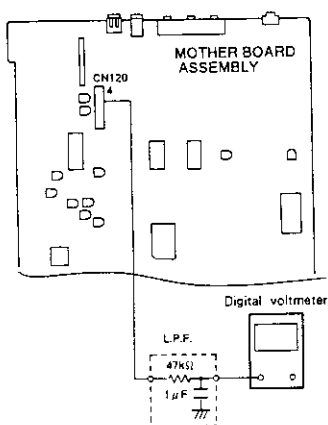
## 2. FOCS RTN CALIBRATION ADJUSTMENT

### Mechanical Adjustment

- Purpose: Setting the slider shaft horizontally to enable the pickup to move over the disc horizontal.
- When not properly adjusted: With a warped disc, the FOCS servo does not function at the inner or outer periphery.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● Digital voltmeter</li> <li>● Low-pass filter (47kΩ + 1 μF)</li> <li>● CN120-4 (FOCS RTN) and GND.</li> <li>● 8-inch LD test disc GGV1003</li> <li>● Test Mode (#9,800 / #25,600, TRKG servo:Open, Tilt servo OFF)</li> <li>● Player SKIP key (During test mode)</li> </ul> |
|--|---|

#### Connection diagram



#### Adjustment Procedure

1. Connect a digital voltmeter to CN120-4 through L. P. F.
2. Open the TRKG servo, and search around for frame #9,800.
3. Check the voltage.
3. Search around for frame #25,600 and check that the voltage is same as the frame #9,800. If not, adjust the SKIP key so that the voltage is same as the frame #9,800.

## 3. CROSTALK ADJUSTMENT

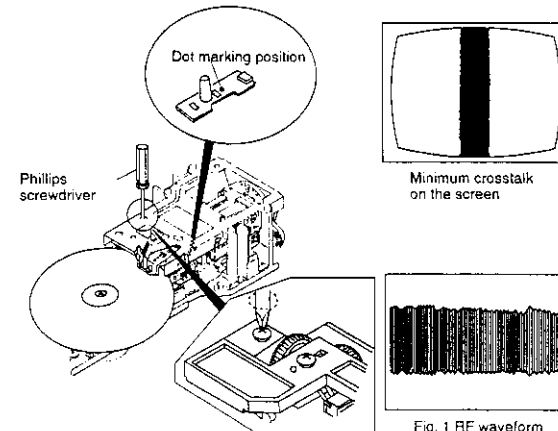
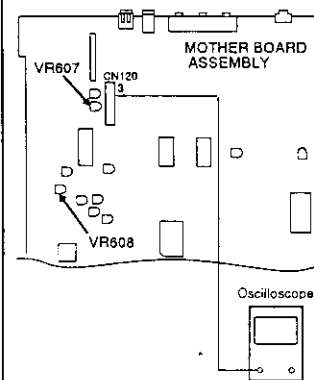
### Pickup Tangential Direction Angle Adjustment and Tilt Servo Balance Adjustment (Pickup TRKG Direction Angle Adjustment)

### Mechanical Adjustment

- Purpose: To adjust the pickup tangential direction angle so as to minimize crosstalk.
- When not properly adjusted: Noticeable crosstalk will appear.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● TV monitor</li> <li>● Phillips screwdriver</li> <li>● Oscilloscope</li> <li>● Crosstalk on the screen</li> <li>● CN120-3(RF)</li> <li>● 8-inch LD test disc GGV1003... #115, #2,701 (black screen)</li> <li>● Still mode</li> <li>● Test Mode (TRKG servo:Open/Close)</li> <li>● The carriage assembly should be in the forward state.</li> <li>● Pickup tangential direction angle adjustment screw</li> <li>● VR608 (TILT GAIN) and VR607 (TILT BAL.)</li> </ul> |
|--|---|

#### Connection diagram



#### Adjustment Procedure

1. Check the color of the dot marked on the top of the tilt servo as shown above.  
Some players have red and blue dots. According to the color of the dot, adjust VR608 as follows:  
Red dot: Turn VR608 fully counterclockwise.  
Blue dot: Turn VR608 fully clockwise.  
No dot: Set VR608 to the center position.
- Tilt Servo Balance Adjustment–  
(Pickup TRKG Direction Angle Adjustment)
2. Confirm that the tilt servo is ON. Set VR607 (TILT BAL.) to the mechanical center.
3. Connect an oscilloscope to CN120-3.
4. Search for frame #2,701 and observe the RF waveform. (Fig. 1)
5. Adjust VR607 (turn to slowly) so that the amplitude of waveform becomes maximum.  
(Turn VR607 to alter the tilt of the pickup assembly TRKG direction.)

6. Search for frame #115 and confirm that the crosstalk on the TV screen becomes minimum.
7. If there is still noticeable crosstalk on the TV screen, perform tangential adjustment as follows.  
–Pickup Tangential Direction Angle Adjustment–
8. Search frame #2,701 and observe the RF waveform (Fig. 1).
9. Insert the phillips screwdriver into the adjustment hole of the side B play mechanism, and adjust the pickup tangential direction angle adjustment screw so that the RF waveform becomes maximum.
10. Search for frame #115 and confirm that the crosstalk on the TV screen becomes minimum.
11. After adjustment is complete, tighten the locking screw and adhere it.

Note: When the pickup tangential angle is changed in the side A play mode, be sure to perform "6. Spindle Motor Centering Check", "12. Centering Adjustment for Side B Play" and "13. Pickup Tangential Direction Angle Adjustment for Side B Play".

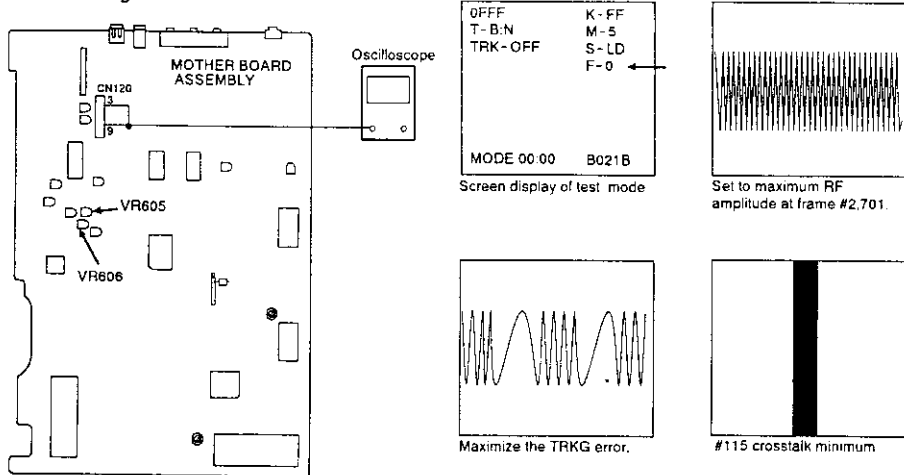
4. TRKG ERROR BEST/ CROSSTALK BEST ADJUSTMENT

Mechanical Adjustment

- Purpose: To set the FOCS servo to the optimum state when playing the normal playback and track jump (search).
- When not properly adjusted: Crosstalk will be generated.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Measuring instruments and jigs:</li> <li>• Measuring point:</li> <li>• Test disc and player mode</li> </ul> | <ul style="list-style-type: none"> <li>• TV monitor</li> <li>• Oscilloscope</li> <li>• CN120-3 (RF)</li> <li>• CN120-9 (TRKG ERR)</li> <li>• Player's VIDEO OUT terminal</li> <li>• 8-inch LD test disc (GGV1003)</li> <li>• Test Mode (TRK servo close / open, Tilt servo OFF)</li> </ul> |
| <ul style="list-style-type: none"> <li>• Positions to be adjusted</li> </ul>   | <ul style="list-style-type: none"> <li>• VR605 (TE BEST)</li> <li>• VR606 (CT BEST)</li> </ul>   |

Connection diagram



Adjustment Procedure

Note : Perform this adjustment when there is still noticeable crosstalk on the TV screen in section "3. Pickup Tangential Direction Angle Adjustment".

1. Connect the oscilloscope to CN120-9.
2. Open the TRK servo.
3. Confirm that the test mode screen display is F-0. If not, set the MULTI - SPEED REV button of the remote control unit to F-0.
4. Adjust VR605 so that the amplitude of the TRKG error waveform becomes maximum.
5. Close the TRKG servo.

6. Connect the oscilloscope to CN120-3.
7. Press the MULTI - SPEED FWD button of the remote control unit to display "F-1" on the TV screen.
8. Search frame #2,701 and adjust VR606 so that the amplitude of the RF waveform becomes maximum.
9. Confirm that the crosstalk on the TV screen becomes minimum at frame #115.

Note : After adjustment is complete, be sure to perform "5. FOCS SUM Level Adjustment".

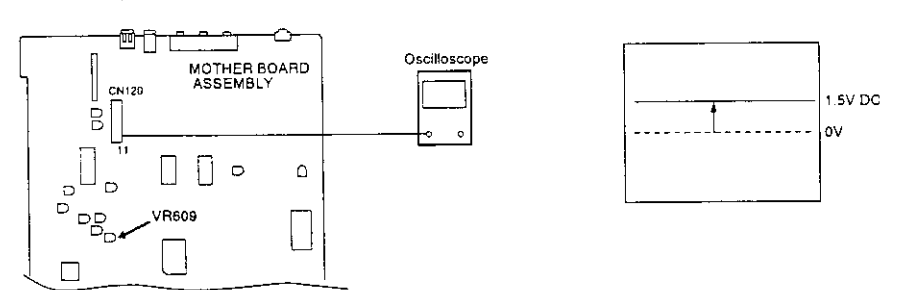
5. FOCS SUM LEVEL ADJUSTMENT

Mechanical Adjustment

- Purpose: To set the sum level (FOCS A+B) of B1 - B4 to the optimum value for activating the FOCS servo.
- When not properly adjusted: Crosstalk will be generated.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Measuring instruments and jigs:</li> <li>• Measuring point:</li> <li>• Test disc and player mode</li> </ul> | <ul style="list-style-type: none"> <li>• TV monitor</li> <li>• Oscilloscope</li> <li>• CN120-11 (FOCS SUM)</li> <li>• 8-inch LD test disc GGV1003...#15,000</li> <li>• Still mode</li> <li>• Test mode (TRKG servo : Close)    • Tilt servo : Neutral</li> </ul> |
| <ul style="list-style-type: none"> <li>• Positions to be adjusted</li> </ul>   | <ul style="list-style-type: none"> <li>• VR609</li> </ul>  |

Connection diagram



Adjustment Procedure

Note : Perform this adjustment after perform the "4. TRKG Error Best / Crosstalk Best Adjustment".

1. Connect the oscilloscope to CN120-11.
2. Adjust VR609 so that the voltage becomes 1.5V DC.

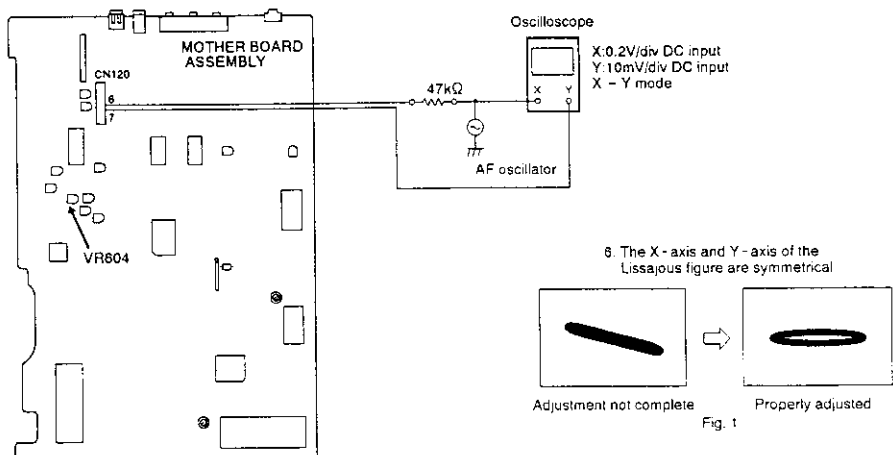
10. FOCUS SERVO LOOP GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: To set the loop gain of the FOCUS servo to the optimum value.
- When not properly adjusted: Performance deteriorates.

- |                                   |   |
|-----------------------------------|---|
| ● Measuring instruments and jigs: | ● Oscilloscope ● AF oscillator ● Resistor (47kΩ)        |
| ● Measuring point:                | ● CN120-6(FOCS ERR) and CN120-7(FOCS IN)                |
| ● Test disc and player mode       | ● 8-inch LD test disc GGV1003...#15,000 ● Still mode    |
|                                   | ● Test mode (TRKG servo:Close) ● Tilt servo : Neutral   |
| ● Positions to be adjusted        | ● The carriage assembly should be in the forward state. |
|                                   | ● VR604   |

Connection diagram



Adjustment Procedure

1. Connect the oscilloscope's X-input(CH-1) via the resistor and AF oscillator to CN120-6, and the Y-input (CH-2) to CN120-7, as shown in the above diagram.
2. Set the AF oscillator output to 1.7kHz/6Vp-p for GGV1003, according to the test disc used.
3. Play the 8-inch LD test disc and search frame #15,000.
4. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
5. Adjust VR604 so that the Lissajous figure is symmetrical on both the X-axis and Y-axis of the oscilloscope. (Fig. 1)

Note : If the AF oscillator output does not exceed 6Vp-p, reduce the value of the resistor (47kΩ) in the above diagram, for easier observation of the Lissajous figure. (not below 33kΩ)

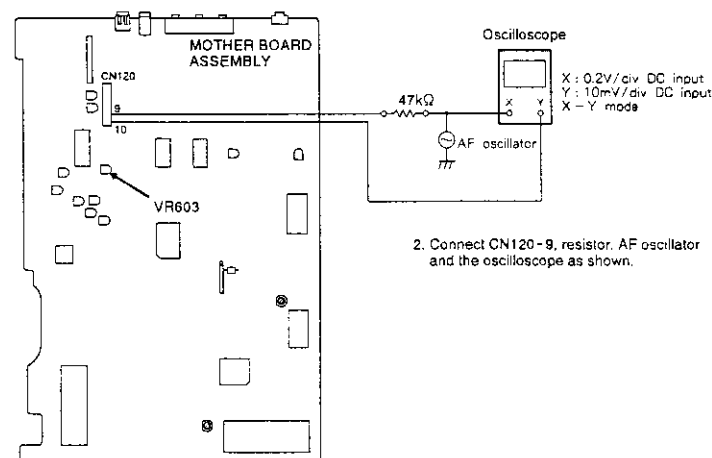
11. TRKG SERVO LOOP GAIN ADJUSTMENT

Mechanical Adjustment

- Purpose: To set the loop gain of the TRKG servo to the optimum value.
- When not properly adjusted: Performance deteriorates

- |                                   |  |
|-----------------------------------|--|
| ● Measuring instruments and jigs: | ● Oscilloscope ● Resistor (47kΩ) ● AF oscillator                                       |
| ● Measuring point:                | ● CN120-9(TRKG ERR), CN120-10(TRKG IN)   |
| ● Test disc and player mode       | ● 8-inch LD test disc GGV1003...#15,000 ● Still mode ● Tilt servo : Neutral            |
|                                   | ● Test mode (TRKG servo:Close) ● The carriage assembly should be in the forward state. |
| ● Positions to be adjusted        | ● VR603  |

Connection diagram



Adjustment Procedure

1. Play the LD test disc and search frame #15,000.
2. Connect the oscilloscope's X-input(CH-1) via the resistor and AF oscillator to CN120-9, and the Y-input (CH-2) to CN120-10, as shown in the above diagram.
3. Set the AF oscillator output to 3.0kHz/6Vp-p for GGV1003, according to the test disc used.
4. Set the oscilloscope to the X-Y mode and observe the Lissajous figure.
5. Adjust VR603 so that the Lissajous figure is symmetrical on both the X-axis and Y-axis of the oscilloscope. (Fig. 1)

Note : If the AF oscillator output does not exceed 6Vp-p, reduce the value of the resistor (47kΩ) in the above diagram, for easier observation of the Lissajous figure. (not below 33kΩ)



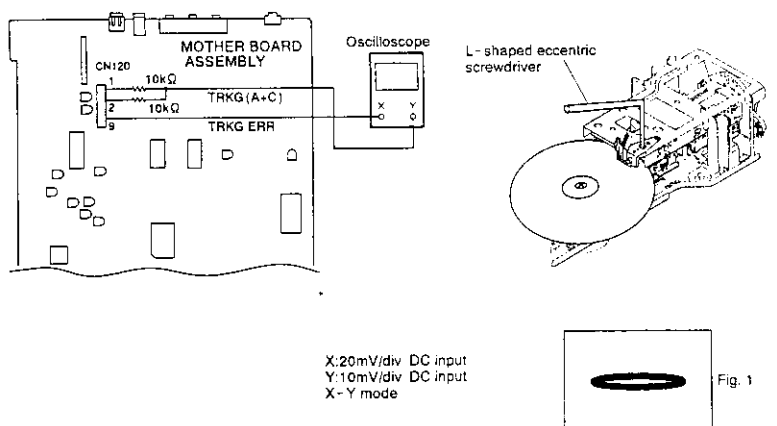
**12. POSITION CHECK AT THE START PLAY AND CENTERING ADJUSTMENT FOR SIDE B PLAY**

**Mechanical Adjustment**

- Purpose: To check that the position check at the start play and to set the center of the spindle motor on the path of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped, longer searching time or searching is impossible when playing side B of the disc.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● L-shaped eccentric screwdriver (GGV-129)</li> <li>● Oscilloscope</li> <li>● Resistor (10kΩ)</li> <li>● CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)</li> <li>● 8-inch LD test disc GGV1003...#100</li> <li>● Play mode</li> <li>● The carriage assembly should be in the reverse state.</li> <li>● Test mode (TRKG servo: Open /Close)</li> <li>● Centering adjustment hole for side B</li> </ul> |
|--|---|

**Connection diagram**



X:20mV/div DC input  
Y:10mV/div DC input  
X-Y mode

4. Centering adjustment for side B play.

4. Properly adjusted (X: maximum).

**Adjustment Procedure**

1. Turn the LD test disc upside-down (change from side A to side B). The start play position from side A to B should be within frame #3,500.
2. Set the oscilloscope to the X-Y mode, and connect the oscilloscope's X-input (CH-1) to CN120-9 (TRKG ERR) and the Y-input (CH-2) to CN120-1 and 2 (TRKG A+C).
3. Play the LD test disc and search frame #100, then open the tracking servo.

*Note: If the center is too eccentric on side B of the disc, since searching will be impossible on side B, open the TRKG servo when the carriage assembly moves to the side B play position and searches around frame #100.*

4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure is minimized (on-track position). Then turn the eccentric screwdriver clockwise further until the X-axis amplitude of the Lissajous figure becomes maximum. (Fig. 1)

*Note: When "3. Tangential Direction Angle Adjustment" is performed with the pickup in the forward state, perform "13. Pickup Tangential Direction Angle Adjustment for Side B Play" and "14. Fine Centering Adjustment for Side B play".*

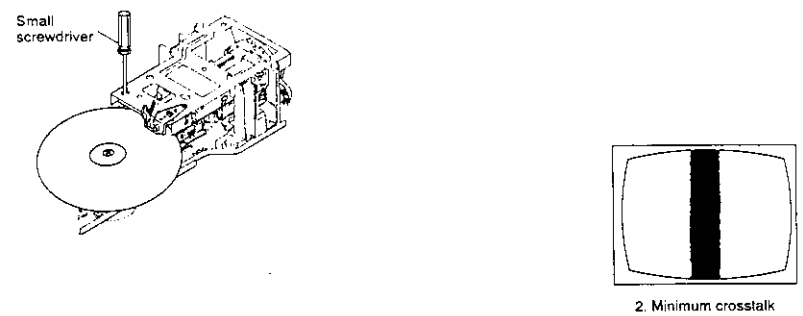
**13. PICKUP TANGENTIAL DIRECTION ANGLE ADJUSTMENT FOR SIDE B PLAY**

**Mechanical Adjustment**

- Purpose: To adjust the crosstalk to become minimum in the tangential direction angle of the pickup assembly when playing side B of the disc.
- When not properly adjusted: Crosstalk is significant.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● TV monitor</li> <li>● Small Phillips screwdriver</li> <li>● Monitor screen</li> <li>● 8-inch LD test disc GGV1003...#115</li> <li>● Still mode</li> <li>● The carriage assembly should be in the reverse state.</li> <li>● Pickup tangential direction angle adjustment screw</li> </ul> |
|--|---|

**Connection diagram**



**Adjustment Procedure**

1. Play the LD test disc and search frame #115.
2. Check if crosstalk appears on the screen of the TV monitor, and adjust the pickup tangential direction angle adjustment screw so that the crosstalk is minimized.
3. After steps 1 and 2 have been completed, perform "12. Centering Adjustment for Side B Play" again.

*Note: When the pickup tangential direction angle for side B play is varied by this adjustment, the center of the disc for side B may be shifted slightly. As a countermeasure, perform the centering adjustment again.*

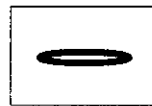
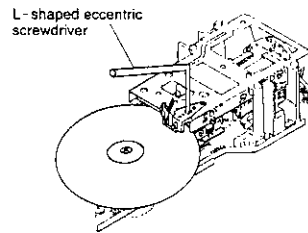
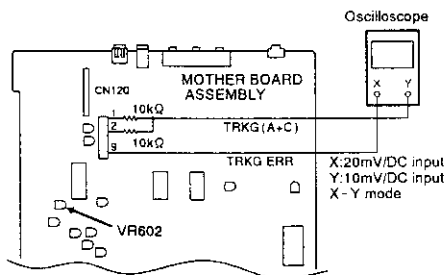
14. FINE CENTERING ADJUSTMENT FOR SIDE B PLAY

Mechanical Adjustment

- Purpose: To set the center of the spindle motor on the track of the laser beam when playing the side B of the disc.
- When not properly adjusted: Tracks skipped when playing side B of the disc.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● Oscilloscope</li> <li>● L- Shaped eccentric screwdriver(GGV-129)</li> <li>● Resistor (10kΩ × 2)</li> <li>● CN120-9 (TRKG ERR), CN120-1 (TRKG C) and CN120-2 (TRKG A)</li> <li>● 8-inch LD test disc GGV1003...#100</li> <li>● Test mode (TRKG servo: Open)</li> <li>● Play mode</li> <li>● The carriage assembly should be in the reverse state.</li> <li>● Centering adjustment hole for side B</li> </ul> |
|--|--|

Connection diagram



4. X - axis of Lissajous figure maximum.

Adjustment Procedure

1. Set the oscilloscope to the X-Y mode, and connect the oscilloscope's X -input (CH-1) to CN120-9 (TRKG ERR) and the Y -input (CH-2) to CN120-1 and 2 (TRKG A+C).
2. Play the LD test disc and search frame #100.
3. Open the TRKG servo.
4. While observing the Lissajous figure on the oscilloscope, insert the eccentric screwdriver into the centering adjustment hole for side B and adjust it so that the X-axis amplitude of the Lissajous figure becomes maximum. (Fig. 1)
5. Turn the power OFF.
6. Fixing and locking the screws as follows:
  - Grating screw
  - Spindle motor centering adjustment screw
  - Pickup tangential direction angle adjustment screw
  - Centering adjustment hole for side B
  - Tilt sensor screw
  - Shaft plate (upper)

8.4.4 ELECTRICAL ADJUSTMENT

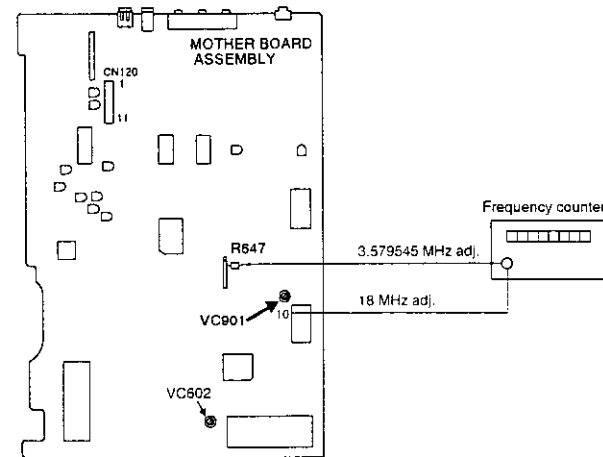
15. REFERENCE FREQUENCY ADJUSTMENT

Electrical Adjustment

- Purpose: Adjustment of the standard clock frequency.
- When not properly adjusted: Incorrect color tint, no TV color lock, and VCXO cannot be adjusted during LDD playback.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> <li>● Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>● Frequency counter</li> <li>● Oscilloscope 10:1 probe</li> <li>● Lead wire of R647</li> <li>● IC605 pin 10</li> <li>● Normal mode (Stop mode (Blueback screen.))</li> <li>● VC901</li> <li>● VC602</li> </ul> |
|--|---|

Connection diagram



Adjustment Procedure

1. Adjust VC901 so that the frequency of the lead wire of R647 becomes 3.579545MHz in the stop mode (blueback screen).

Note : The frequency counter probe should be an oscilloscope 10 : 1 probe.

2. Adjust VC602 so that the frequency of the IC605 pin 10 becomes 18 MHz in the play mode.

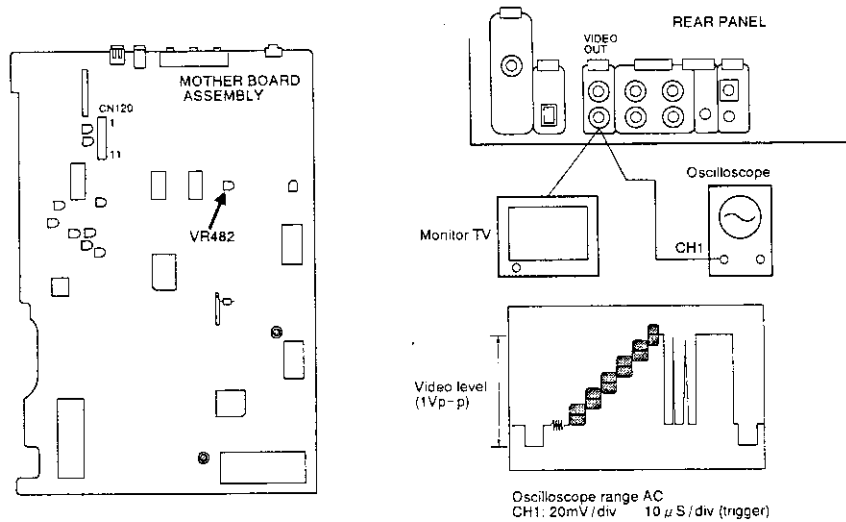
16. OUTPUT VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Setting the video signal level to 1Vp-p (75 Ω termination).
- When not properly adjusted: The player starts up midway without reading the data. The screen is too bright or too dark.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Measuring instruments and jigs:</li> <li>• Measuring point:</li> <li>• Test disc and player mode</li> <li>• Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>• Oscilloscope</li> <li>• Player's VIDEO OUT terminal</li> <li>• 8-inch LD test disc (GGV1003)</li> <li>• Normal mode (Still mode, #19,900)</li> <li>• VR482</li> </ul> |
|--|--|

Connection diagram



Adjustment Procedure

Note: Since the VIDEO OUT terminal will be connected to a TV monitor, it is to have 75Ω termination. (If it is connected to a TV via VHF OUT, terminate the VIDEO OUT terminal with a 75Ω resistor).

1. Search for frame #19,900 on the test disc.
2. Adjust VR482 so that the white level becomes 0.71Vp-p ± 5% from the video signal's sync tip level.

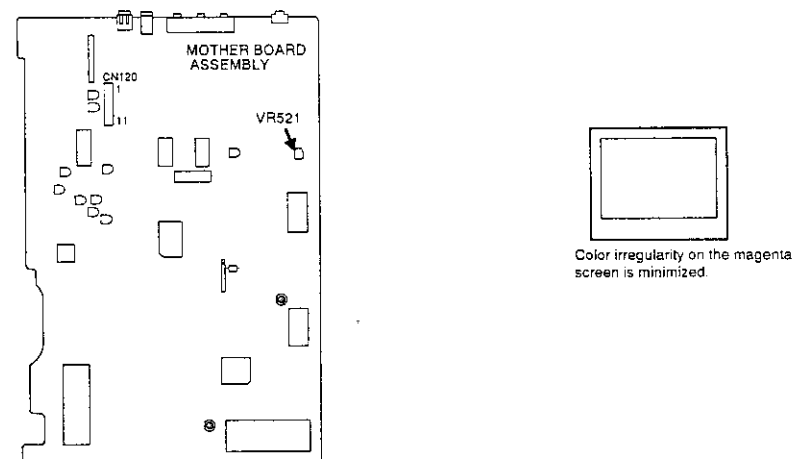
17. COLOR TINT ERROR SIGNAL LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: Optimization of the color tint compensation section's error signal level.
- When not properly adjusted: There is substantial color irregularity. (especially for CDV.)

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Measuring instruments and jigs:</li> <li>• Measuring point:</li> <li>• Test disc and player mode</li> <li>• Positions to be adjusted</li> </ul> | <ul style="list-style-type: none"> <li>• TV monitor</li> <li>• 8-inch LD test disc (GGV1003)</li> <li>• Normal mode (Still mode, #8,000)</li> <li>• VR521</li> </ul> |
|--|--|

Connection diagram



Adjustment Procedure

1. Search for frame #8,000 on the test disc. (Magenta screen)
2. Adjust VR521 until the color irregularity on the magenta screen is minimized.

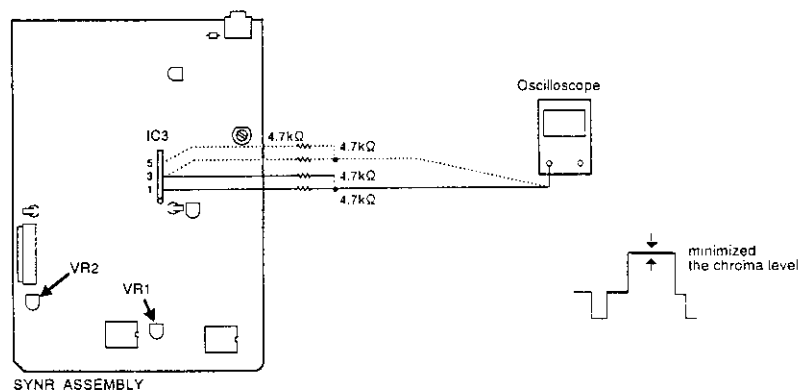
**SYNR ASSEMBLY ADJUSTMENT**

**18. CHROMA LEVEL ADJUSTMENT (1)**

Electrical Adjustment

<ul style="list-style-type: none"> <li>● Purpose: To adjust the SYNR assembly to the optimum condition.</li> <li>● When not properly adjusted: Dot obstruction of the S video output.</li> </ul>	
<ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> </ul>	<ul style="list-style-type: none"> <li>● Oscilloscope</li> <li>● Resistors (4.7kΩ × 2)</li> <li>● IC3 - pin1 and pin3/ pin3 and pin5</li> <li>● 8 - inch LD test disc (GGV1003)...#8,000 Still mode</li> </ul>
<ul style="list-style-type: none"> <li>● Positions to be adjusted</li> </ul>	<ul style="list-style-type: none"> <li>● VR1, VR2</li> </ul>

**Connection diagram**



**Adjustment Procedure**

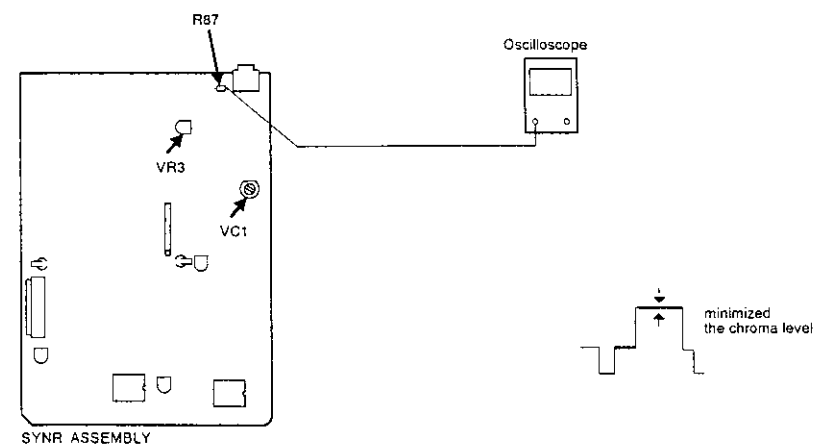
1. Connect the oscilloscope to pin1 and pin3 of IC3(CX-A1413L) via the resistors(4.7kΩ)
2. Play the LD test disc and search for frame #8,000. (Magenta screen)
3. Adjust VR1 so that the chroma level becomes minimum.
4. Connect the oscilloscope to pin3 and pin5 of IC3 via the resistors. Adjust VR2 so that the chroma level becomes minimum.

**19. CHROMA LEVEL ADJUSTMENT (2)**

Electrical Adjustment

<ul style="list-style-type: none"> <li>● Purpose: To adjust the SYNR assembly to the optimum condition.</li> <li>● When not properly adjusted: Dot obstruction of the S video output.</li> </ul>	
<ul style="list-style-type: none"> <li>● Measuring instruments and jigs:</li> <li>● Measuring point:</li> <li>● Test disc and player mode</li> </ul>	<ul style="list-style-type: none"> <li>● Oscilloscope</li> <li>● Lead wire of R87 at the JA1 (S VIDEO OUT) side</li> <li>● 8 - inch LD test disc (GGV1003)...#8,000 Still mode</li> </ul>
<ul style="list-style-type: none"> <li>● Positions to be adjusted</li> </ul>	<ul style="list-style-type: none"> <li>● VR3, VC1</li> </ul>

**Connection diagram**



**Adjustment Procedure**

1. Connect the oscilloscope to the lead wire of R87 at the JA1 side.
2. Search for frame #8,000 and observe the waveform.
3. Adjust VR3 and VC1 alternatly so that the chroma level becomes minimum.

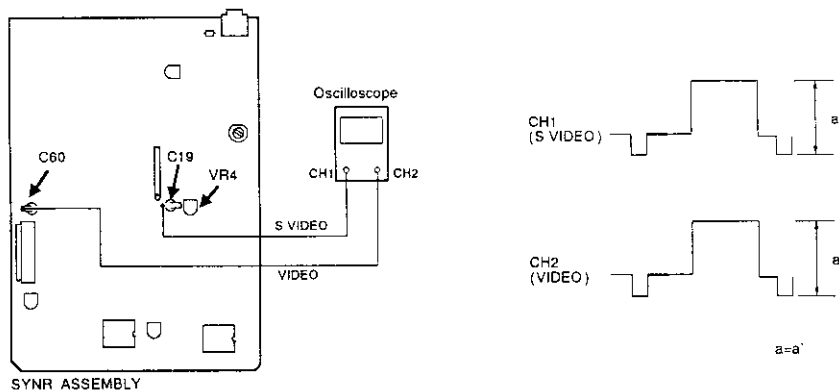
20. S VIDEO LEVEL ADJUSTMENT

Electrical Adjustment

- Purpose: To set the S video level to the optimum value.
- When not properly adjusted: Screen of the S video is dark.

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>• Measuring instruments and jigs:</li> <li>• Measuring point:</li> <li>• Test disc and player mode</li> </ul> | <ul style="list-style-type: none"> <li>• Dual trace oscilloscope</li> <li>• CH1 : lead wire of C19 +side CH2: lead wire of C60 - side</li> <li>• 8 - inch LD test disc (GGV1003)... #3,801 ( White screen )</li> </ul> |
| <ul style="list-style-type: none"> <li>• Positions to be adjusted</li> </ul>   | <ul style="list-style-type: none"> <li>• VR4</li> </ul>  |

Connection diagram



Adjustment Procedure

1. Connect the CH1 of the oscilloscope to the +side lead wire of C19(S video) and CH2 to the - side lead wire of C60(Video signal).
2. Play the LD test disc and search for frame #3,801.
3. Adjust VR4 so that the CH1's video level is the same as the CH2's video level.

9. ABBREVIATIONS TABLE

<b>A</b>	ACCEL ACOM AF AFM AGC ALC ANT ATC	ACCELERATE AUDIO COMPENSATOR AUDIO FREQUENCY ANALOGUE FM AUDIO AUTOMATIC GAIN CONTROL AUTOMATIC LEVEL CONTROL ANTENNA AUTOMATIC THRESHOLD CONTROL	<b>M</b>	MTR μCOM	MOTOR MICROCOMPUTER
<b>B</b>	BAL	BALANCE	<b>P</b>	PD PB PLL P-ON	PHOTO DETECTOR PLAYBACK PHASE LOCKED LOOP POWER ON
<b>C</b>	CAV CLV CCD CD CK CONT C-SYNC CX	CONSTANT ANGULAR VELOCITY CONSTANT LINEAR VELOCITY CHARGE COUPLED DEVICE COMPACT DISC CLOCK CONTROL COMPOSITE SYNCHRONIZATION AFM NOISE REDUCTION	<b>R</b>	R-CH RTN RFMD RST REV RF-CORR	RIGHT CHANNEL RETURN RADIO FREQUENCY MODULATOR RESET REVERSE RF CORRECTION
<b>D</b>	DEM DIG/ANA DL DSP DOS DRV	DEMODULATOR DIGITAL/ANALOGUE DELAY LINE DIGITAL SIGNAL PROCESSOR DROP OUT SENSE DRIVER	<b>S</b>	SPDL SLD SO SI SCK SC SYPS SW S/H SENS SQ	SPINDLE SLIDER SERIAL OUTPUT SERIAL INPUT SERIAL CLOCK CHIP SELECT SYSTEM POWER SUPPLY SWITCH SAMPLE & HOLD SENSITIVITY SQUELCH
<b>E</b>	EFM ERR EQ EXT	EIGHT TO FOURTEEN MODULATION ERROR EQUALIZER EXTERNAL	<b>T</b>	TRK or TRKG TP TBC TGL	TRACKING TEST POINT TIME BASE CORRECTION TOGGLE
<b>F</b>	FCS or FOCs FG FL FTS Fsc FWD	FOCUS FREQUENCY GENERATOR FLUORESCENT LAMP FOCUS TRACKING SLIDER CHROMINANCE SUBCARRIER FREQUENCY FORWARD	<b>U</b>	UNREG	UNREGULATED
<b>G</b>	GFS GND	GET FRAME SYNC LOCK GROUND	<b>V</b>	V-SYNC VSQ VPS VDEM VHF VCA VCO	VERTICAL SYNCHRONIZATION VIDEO SQUELCH VIDEO PHASE SHIFTER VIDEO DEMODULATOR VERY HIGH FREQUENCY VOLTAGE CONTROLLED AMPLIFIER VOLTAGE CONTROLLED OSCILLATOR
<b>H</b>	HLD H SYNC	HOLD HORIZONTAL SYNCHRONIZATION	<b>X</b>	X...	ACTIVATED WHEN LOW VOLTAGE
<b>I</b>	INT iR	INTERNAL INFRARED RAYS			
<b>L</b>	L-CH LAT LD LPF LIM	LEFT CHANNEL LATCH LASER DIODE LOW PASS FILTER LIMITER			

## 10. SPECIFICATIONS

### 1. General

System ..... LaserVision Disc system and Compact Disc digital audio system  
 Laser ..... Semiconductor laser wavelength 780 nm  
 Power requirements  
 U.S. and Canadian models ..... AC 120V, 60 Hz  
 Multi voltage models ..... AC 110 - 127 V/220 - 240 V (Switchable), 50/60 Hz

Power consumption  
 U.S. and Canadian models ..... 50 W  
 Multi voltage models ..... 50 W  
 Weight ..... 8.6 kg (19 lbs)  
 Dimensions ..... 420 (W) x 438 (D) x 137 (H) mm  
 16-9/16 (W) x 17-1/4 (D) x 5-3/8 (H) in  
 Operating temperature ..... +5°C ~ +35°C (41°F - 95°F)  
 Operating humidity ..... 5% ~ 90% (There should be no condensation of moisture.)

### 2. Disc

#### LaserVision Discs

\*Maximum playing times  
 12-inch standard play disc ..... 1 hour/both sides  
 12-inch extended play disc ..... 2 hours/both sides  
 8-inch standard play disc ..... 28 min/both sides  
 8-inch extended play disc ..... 14 min/one side  
 8-inch extended play disc ..... 40 min/both sides  
 20 min/one side  
 Spindle motor speed  
 Standard play disc ..... 1,800 rpm  
 Extended play disc ..... 1,800 rpm (inner circumference) to 600 rpm (outer circumference) (For a 12-inch disc)

#### Compact Discs

DISC ..... Diameter: 5-inch, 3-inch, Thickness: 1.2 mm  
 Rotation direction (pickup side) ..... Counterclockwise  
 Linear speed ..... 1.2 ~ 1.4m/sec  
 \*Maximum playing time  
 74 min. 5-inch discs  
 20 min. 3-inch discs (For stereo playback)

#### Compact Discs with Video

Disc ..... Diameter: 5-inch, Thickness: 1.2 mm  
 Rotation direction (pickup side) ..... Counterclockwise  
 Linear speed ..... Audio portion: 1.2 ~ 1.4m/sec  
 Video portion: 11 ~ 12m/sec  
 Maximum playing time ..... Video portion: 5 min. (CLV)  
 Audio portion: 20 min. (Digital)

\* Actual playback time differs for each disc.

### 3. Video characteristics

Format ..... NTSC specifications  
 Video output  
 Level ..... 1 Vp-p nominal, sync. negative, terminated  
 Impedance ..... 75Ω unbalanced  
 Jacks ..... Both RCA jacks

### 5. S-Video output

Y (luminance) - Output level ..... 1 Vp-p (75 Ω)  
 C (color) - Output level ..... 286 mVp-p (75 Ω)  
 Jack ..... S-VIDEO jack

### 4. Audio characteristics

Output level  
 During analog audio output ..... 200 mVrms (1 kHz, 40%)  
 During digital audio output ..... 200 mVrms (1 kHz, -20 dB)  
 Jacks ..... Both RCA jacks  
 Number of channels ..... 2

#### Digital Audio Characteristics

Frequency response	4 Hz - 20 kHz (±0.2 dB) (EIAJ)
SN ratio	115 dB (EIAJ)
Dynamic range	99 dB (EIAJ)
Channel separation	105 dB (EIAJ)
Total harmonic distortion	0.0018% (EIAJ)
Wow and flutter	Limit of measurement (EIAJ)

### 5. Other Terminals

Control input/output ..... Both miniature jacks  
 CD-DECK synchro ..... Miniature jack  
 Optical digital output ..... Optical digital jack


### 6. Accessories

Remote control unit (CU-CLD038) ..... 1  
 Size "AAA" (IEC R03) dry cell batteries ..... 2  
 Video cord ..... 1  
 Audio cord ..... 1  
 Operating instructions ..... 1  
 Warranty card ..... 1

**7. Functions**

Remote control unit operations (CU-CLD038)

	Function	Standard play Disc (CAV)	Extended play Disc (CLV)	Compact Disc with Video	Compact Disc
Basic Functions	Two-side play	YES	YES	NO	NO
	Single-side play	YES	YES	YES	YES
	Pause	YES	YES	YES	YES
	Stop	YES	YES	YES	YES
Search	Fast forward (forward and reverse)	YES	YES	YES	YES
	Chapter/Track skip	YES	YES	YES	YES
	Direct chapter/Track number search	YES	YES	YES	YES
	Frame number search	YES	NO	NO	NO
	Time number search	NO	YES	YES	YES
	Absolute time search	NO	NO	NO	YES
Program	Chapter/Track program play	YES	YES	YES	YES
	Program correction	YES	YES	YES	YES
Repeat	Repeat between 2 points	YES	YES	YES	YES
	Memory repeat	YES	YES	YES	YES
	Chapter/Track repeat	YES	YES	YES	YES
	One-side repeat	YES	YES	YES	YES
	Two-side repeat	YES	YES	NO	NO
	Program repeat	YES	YES	YES	YES
	Random repeat	YES*1	YES*1	YES	YES
	Program random repeat	YES	YES	YES	YES
Trick play	Still/Step	YES	YES	YES*5	NO
	Multi-speed (Forward/reverse 8-level variable)	YES	YES	YES*5	NO
	Still with Sound	YES	YES	YES*5	NO
	Strobe motion	YES	YES	YES*5	NO
	Jog dial/Shuttle ring	YES	YES	YES*5	YES
Time display	Elapsed time display	NO	YES	YES	YES
	Absolute time display	YES*1	NO	NO	YES
	Remaining track time display	NO	NO	YES	YES
	Remaining total time display	YES*1	YES*1	YES	YES
	Total number of selections, total time display	YES*1	YES*1	YES	YES
Others	CX system ON/OFF	YES*2	YES*2	NO	NO
	AUTO DIGITAL/ANALOG switch	YES*3	YES*3	NO	NO
	One-shot memory	YES	YES	YES*4	NO
	Audio channel selection (Stereo, 1/L, 2/R)	YES	YES	YES	YES

\*1 Only discs with TOC  
 \*2 Valid for analog sound playing a disc with the  mark.  
 \*3 Can only be used with discs with digital sound tracks.  
 \*4 Audio part only  
 \*5 Video part only

**NOTE:**  
 The specifications and design of this product are subject to change without notice, due to improvement.

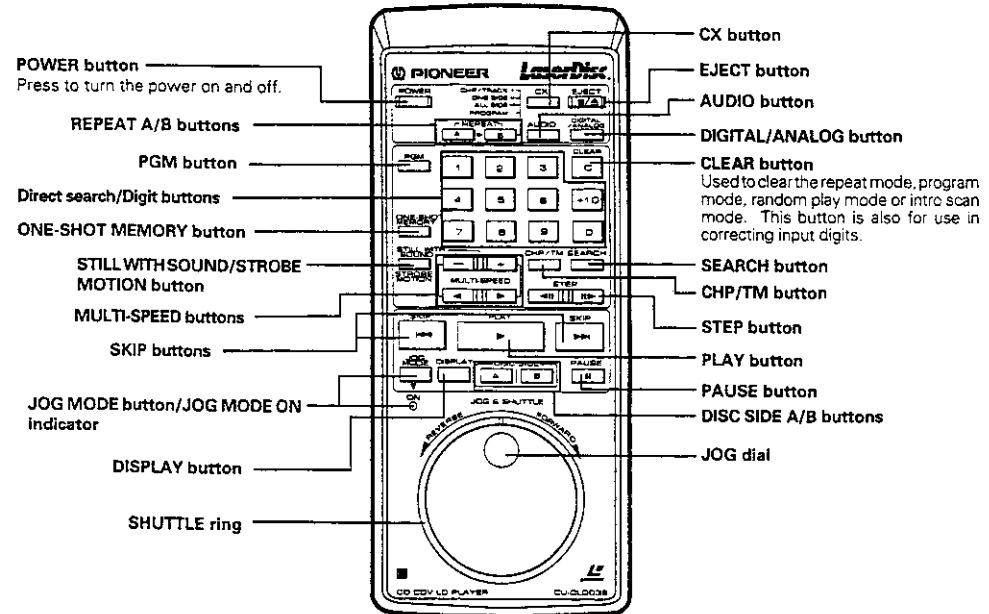
**PLAYER FUNCTIONS**

- Display ON/OFF, Visual Calendar Display
- Intro Scan, Direct CD, Single Play, Peak Search, Random Playback and Compu Program/Auto Program Edit
- Digital Sound for LaserVision Discs
- Last Memory

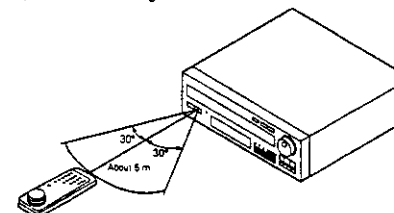
**11. PANEL FACILITIES**

**• REMOTE CONTROL UNIT**

Remote control buttons with the same names or marks as buttons on the front panel of the player control the same operations as the corresponding front panel buttons.



When operating the remote control unit, point the unit's infrared signal transmitter at the remote control receiver (REMOTE SENSOR) on the front panel of the player. The remote control unit can be used within a range of about 5 meters (16 feet) from the remote sensor, and within angles of up to about 30 degrees.



**NOTE FOR USING THE REMOTE CONTROL UNIT**

- If a plug is connected to the CONTROL IN terminal at the rear of the player, remote control operations cannot be done with the remote control unit aimed at the player's remote control sensor. Aim the remote control unit at the AV control center or the component display's sensor instead.

- If there is any obstacle between the remote control unit and the player, or if the unit is held at too large an angle relative to the front panel of the player, the signal from the remote control unit will fail to reach the remote sensor.
- If the player is operating in the vicinity of other appliances generating infrared rays, or if other remote control devices using infrared rays are used near the player, the player may operate improperly. Conversely, if the player's remote control unit is operated in the vicinity of other appliances which use an infrared remote control device, the other appliance may operate improperly. If this should happen, change the place of installation so that improper operation does not occur.
- If the range of operation of the remote control unit becomes too short, replace the batteries.
- When the unit is not to be used for a long period of time (more than one month), remove the batteries to prevent them from leaking inside the compartment. If leakage occurs, wipe up the liquid inside the compartment and replace the batteries with new ones.
- Do not place books or other objects on the remote control unit, since they might depress the buttons and run down the batteries.
- If the remote control sensor window is in a position where it receives strong light such as sunlight or fluorescent light, control may not be possible.

● FRONT PANEL

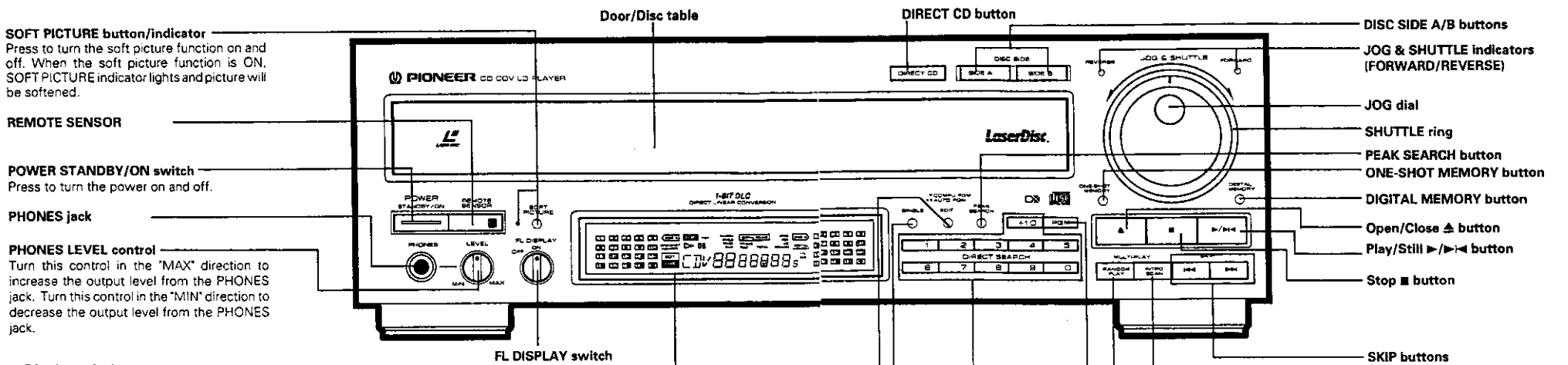
**SOFT PICTURE button/indicator**  
Press to turn the soft picture function on and off. When the soft picture function is ON, SOFT PICTURE indicator lights and picture will be softened.

**REMOTE SENSOR**

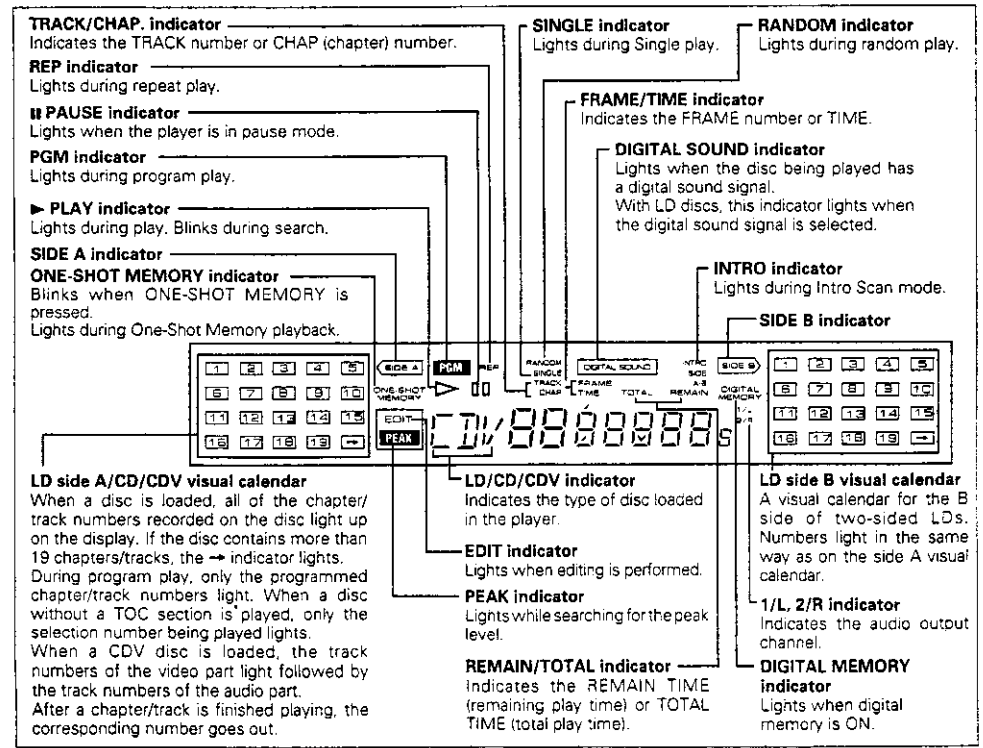
**POWER STANDBY/ON switch**  
Press to turn the power on and off.

**PHONES jack**

**PHONES LEVEL control**  
Turn this control in the "MAX" direction to increase the output level from the PHONES jack. Turn this control in the "MIN" direction to decrease the output level from the PHONES jack.



Display window



**DIGITAL MEMORY button:**  
When playing a CAV or CLV disc, turning the digital memory function ON allows you to enjoy special playback functions such as still frame and multi-speed playback with no screen disturbance. If the digital memory function is OFF, it will automatically turn ON when you fast-forward, fast-reverse or activate a special playback function (except with CAV discs). When digital memory is OFF, screen disturbance may occur momentarily when an operation such as fast-forward is carried out. However, horizontal resolution is better than when digital memory is ON.

**Notes:**

- When using a special function obtained by connecting a commercially available adaptor (such as a caption adaptor), be sure to turn the digital memory function OFF. The adaptor will not function properly if digital memory is left ON.
- Screen disturbance may occur momentarily when an operation such as fast-forward, fast-reverse or a special playback function is carried out when digital memory is OFF. This is not a malfunction or disc defect.
- This player memorizes the ON/OFF condition of the digital memory function even if the power is turned off. Turn the digital memory function ON or OFF as required the next time you play a disc. The "DIGITAL MEMORY" indicator lights in the display window when digital memory is ON.